AUTOLOG 1000

AUTOMOTIVE COMPUTER

USER MANUAL

AUTOLOG 1000

AUTOMOTIVE INSTRUMENTATION COMPUTER

USER MANUAL

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1.00 Introduction.

   The Autolog 1000 automotive computer provides the user with the following features uniquely contained in one instrument:-

>   A powerful trip computer, giving comprehensive information on fuel use, speed and times.
>   An overspeed warning system with audible alarms.
>   A set of trip meters, service interval meters and service interval alarms.
>   A vehicle performance measurement system capable of plotting performance graphs.
>   A versatile trip logger giving printed trip log reports for many purposes.
>   Calibration systems for accurately setting up the computer to suit vehicle specifications.
>   A maintenance system for helping diagnose installation and other problems.
>   Optional Engine Computer Analyser menus for engine ALDL data link.

   The Autolog 1000 has a user control panel consisting of a large 16-character display window and five push buttons. The operations of the unit are controlled by selecting the appropriate item from an extensive menu system.

   The Autolog 1000 allows the user to calibrate its operation to match both standard and non-standard vehicles. Initial set-up for standard vehicles is simple. A comprehensive set-up and calibration system caters for highly customised vehicles where custom wheel sizes and diff ratios have been used.

   Autolog installation is simple, it requires connection of only seven wires (nine with ALDL option), most of which go to the existing vehicle instrument cluster. The Autolog is powered from the vehicle battery through the ignition switch while the vehicle is operating, and by its own internal 5-year life battery when the vehicle is not in use. The Autolog unit may be removed from the vehicle without loss of data or calibration.

   The Autolog 1000 is capable of printing graphs of vehicle performance information during acceleration up to a selectable speed (up to 250 kph) or over a selectable distance (up to 1000 metres). The printed performance graphs show at 0.1 second intervals the vehicle speed and engine rpm. Alongside of each line on the graph are printed the actual elapsed time, vehicle speed, engine rpm and distance travelled. The Autolog display shows the elapsed time accumulating during the performance tests and the resulting time at the end of the test. There are three run data memories for storing performance graph data, the graph from each run memory can be printed separately.

   The Autolog 1000 contains a powerful trip logger, which will produce, printed trip log reports, there are report formats for fringe benefits taxation requirements and fleet performance analysis, and additionally there is an Autolog system installation/maintenance test report. The Autolog will produce neatly formatted log reports without needing an external personal computer. The Autolog automatically takes care of many of the vehicle data recording chores encountered by drivers using vehicles during their daily professional activities. The trip logger is both quick and simple to use at the start of each trip, and can be set to log all trips automatically without any driver action.

   Each Autolog 1000 has an unique security password identity which must be entered before the unit can be set-up for a particular vehicle or used to produce printed reports, This feature makes stolen Autolog systems valueless to anybody without the unit's unique password code.

1.10 Front and Rear views of the Autolog 1000.
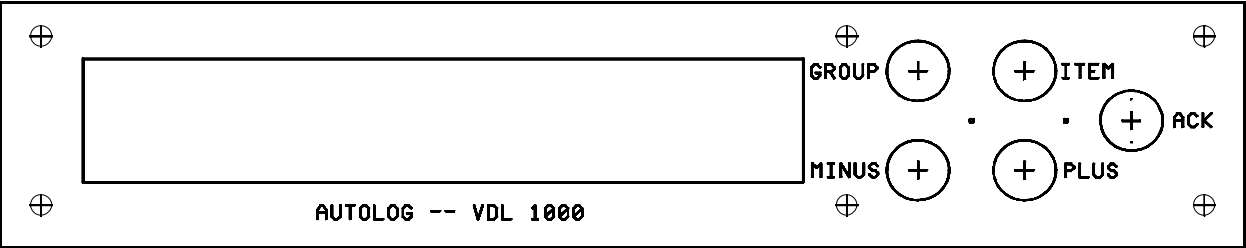
Front View of the Autolog 1000
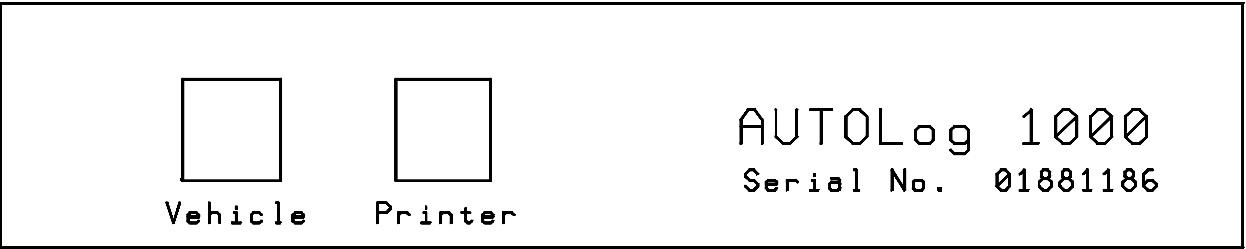
Rear View of the Autolog 1000

2.00 The Function Selection Menu System.

 The Autolog 1000 is controlled by means of a two level menu system. Menu-group and menu-item selection is done by using the 'GROUP' and 'ITEM' buttons. These are the topmost buttons on the control panel.

 The menu system top level is controlled by the GROUP button, pressing this button will display the next menu group, continually rotating the menu system through the following menu group headings: -

```
[ TRIP TYP/DVR >    The trip logger driver/trip purpose menu
[ VEHICLE DATA >    The display-only 'trip computer' menu.
[ O'SPEED MON  >    Vehicle overspeed warning set-up.
[ RESETABLES   >    Resetable tripmeters, and alarms etc.
[ ALARMS       >    Alarm interrogation menu.
[ PERFORMANCE  >    Vehicle performance graph menu.
[ TRIP LOGGER  >    Display, set-up and print of trip logger info.
[ SETUP & CALS >    Set-up for time,date,odometer etc.
[ MAINTENANCE  >    Autolog 1000 maintenance and calibration data.
```

 When the Autolog 1000 is fitted with the Assembly Line Diagnostic Link (ALDL) option for Analysing the Engine Control Module (ECM) there are two more menu groups in the above list, information on this option is contained in Appendix C of this manual.

 Once a menu group heading has been selected, pressing the ITEM button will step the display to the next item within that group, rotating back to the initial group heading after the last item has been selected. (See sect 3.00).

 Depressing either the GROUP or ITEM button for longer than half a second will cause either the previous menu group or item to be selected. This provides a means of quickly returning to a menu group or item that has been overshot or returning to a previous group or item in the menu system.

2.10 Overspeed Warning System.

 The Autolog is equipped with a driver settable vehicle overspeed warning system. This system sounds an alarm whenever the vehicle exceeds the selected speed. Each time the vehicle ignition is turned on the overspeed warning system is set to an initial speed equal to the value in the 'INITIAL KPH XX' menu item, the standard default speed is 70 KPH . The at-start-up on/off state of the overspeed alarm is set according to the 'INITIAL STAT XX' menu item which defaults to ON as standard. Both the 'INITIAL' at-start-up speed and on/off state are user adjustable from within the '[O'SPEED MON > ' menu group. (See also 3.30).

 Whenever the Autolog display is showing a menu group heading or a display-only display, depressing the PLUS button, the MINUS button or the ACK button will set the overspeed warning speed to a new value.
 The PLUS button increments the speed. The MINUS button decrements the speed. The ACK button sets the speed to the start of the next 'O'SPEED INC' speed group above the current vehicle speed, for example, if 'O'SPEED INC' is 10 kph and the current speed is between 70 and 79 kph then pressing the ACK button will set the overspeed warning to sound at any speed above 80 kph, similarly if the 'O'SPEED INC' is 5 kph and the current speed is between 80 and 84 the resultant warning speed will be 85 kph. The default value for 'O'SPEED INC' is 10 kph. Section 3.30 contains information on changing this value.

2.10 Overspeed Warning System (continued).

Changes to the overspeed warning speed will cause the new speed to be displayed, this display temporarily overrides the current menu item display for a period of 1.5 seconds and appears as: -

'O'SPEED KPH XX', where XX is the new overspeed warning speed. (See also 3.30).

The overspeed warning alarm is two short beeps of the beeper, if overspeed continues and exceeds 15 kph above the warning speed the beeper starts to continuously sound two longer beeps at one second intervals. An overspeed warning condition is accompanied by the display of the current Speedo/Tacho reading, this display overrides the current menu item display for as long as the overspeed condition exists and appears as 'RPM XXXX KPH XXX ' as in the '[VEHICLE DATA >' menu (3.20).

The overspeed alarm may be toggled both off and on by pressing both the GROUP and ACK buttons together. Turning the overspeed alarm on or off will cause the new overspeed alarm status to be displayed, this display temporarily overrides the current menu item display for a period of 1.5 seconds and appears as:

'O'SPEED STAT SS', where SS is the ON or OFF status of the overspeed warning system. (See also section 3.30).

The manual section dealing with the '[O'SPEED MON >' menu (3.30) describes the overspeed warning system in more detail.

2.20 Display Backlight Brightness Control.

The Autolog display is illuminated by green backlighting, the level of this illumination can be set by the user whenever the display is showing a menu group heading or a display-only display. The brightness of the backlight can be set to any one of four pre-set levels. Depressing both the ITEM and PLUS buttons together makes the display brighter, depressing the ITEM and MINUS buttons together makes the display dimmer. Alterations to the backlight illumination level will cause the new backlight level to be displayed, this display overrides the current menu item display for a period of 1.5 seconds and appears as 'DISP BACKLIGHT X', where X is the backlight level between 0 (lowest) and 3 (highest).

3.00 Display Menu Descriptions.

3.10 TRIP TYP/DVR menu items.

    This menu group is part of the Autolog trip logger; it allows the user to select from pre-set codes or names for the vehicle driver and the purpose of the current trip. This can be done at any time during the trip, up to the time the vehicle ignition is turned off. The user can select from eight driver-names/codes and eight trip-type codes using this menu group.

    The PLUS and MINUS buttons allow the driver to select his name and the appropriate trip type from the tables of pre-set names and types in memory. These pre-sets are initially established using the DRIVERS and TRP TYPES menu items in the '[TRIP LOGGER >' menu group (3.70)

Pressing the ITEM button after the '[TRIP TYP/DVR >' group heading appears will rotate the display through the following menu items :-

```
   TRIP:      TTTTTT       Select from pre-set trip types with + and - buttons.
   DRIVER:    DDDDDD       Select from pre-set driver names with + and - buttons.
   AUTO PROMPT    ??       Select for a driver trip prompt at vehicle start-up time.
   [ TRIP TYP/DVR >        Menu group heading.
```

    The following codes are used to signify driver and trip codes: -

```
   TTTTTT      is six character trip type or code.
   DDDDDD      is six character driver name or code.
       ??      is ON = prompt is on, OF = prompt is OFF
```

    The 'AUTO PROMPT   ??' menu item allows the user to set-up a prompt for a driver name and trip type immediately the vehicle is started, this start-up prompt will occur when the 'AUTO PROMPT ??' function is set to 'ON'. To change the auto prompt setting press GROUP and ACK together to get the cursor, then press PLUS or MINUS to make the change, then press ACK to confirm the change or ITEM to abandon the change.

3.11 Autolog startup with AUTO PROMPT set ON.

  When 'AUTO PROMPT ??' is set to 'ON' the action of turning on the vehicle ignition normally causes a flashing 'DRIVER TRIP ACK?' prompt display interleaved with the display of the driver name and trip type of the last trip. The auto prompt entry into the flashing display also starts the warning beeper at a one beep per second rate, from then on the warning beeper will not stop until this menu group is exited using the ACK button to acknowledge the driver name and trip type.

Pressing the ITEM button will rotate the display through the following menu items: -

```
   TRIP:      TTTTTT       Select from pre-set trip types with + and - buttons.
   DRIVER:    DDDDDD       Select from pre-set driver names with + and - buttons.
 * DRIVER TRIP ACK?      \ Display alternates both displays marked *
 * DDDDDD TTTTTT         / validate trip and driver with ACK button.
```

The following codes are used to signify driver and trip codes: -

```
   TTTTTT      is six character trip type or code.
   DDDDDD      is six character driver name or code.
```

3.11 Autolog Startup with AUTO PROMPT set ON (continued).

If the purpose of the current trip is the same as the last trip the driver merely has to depress the ACK button to validate this and thereby exit this menu group and the auto prompt sequence.

During this auto prompt sequence the driver may select a different driver name or trip purpose using the ITEM button to get to the 'TRIP:' (type) or 'DRIVER:' (name) menu items, the PLUS and MINUS buttons allow the driver to make new selections.

This sequence is exited on depression of the ACK button confirming the selected driver name and trip type while the 'DRIVER TRIP ACK?' display is flashing. Upon exit of the auto prompt sequence, the Autolog display will resume the last Autolog display selected on the previous trip.

Disabling the DRIVER/TRIP ACK? prompt for vehicle maintenance.

In addition to turning the auto prompt 'OF', the auto prompt can be disabled by the selection of the 'VEH_MT' trip type from the 'TRIP: TTTTTT' trip type list. The selection of this trip type both disables the auto prompt and causes the VEH_MT trip type to appear on all log entries for all trips made during vehicle maintenance.

When in vehicle maintenance mode the Autolog operates as if the auto prompt is 'OF' and remains silent at vehicle start-up and does not prompt for a driver name or trip type. This allows the user to have his vehicle serviced without the Autolog unit emitting prompt beeps every time the vehicle is started by the maintenance facility personnel.

3.20 VEHICLE DATA menu items.

This menu group provides display-only trip computer functions. Depressions of the ITEM button will rotate the display through the following menu items: -

```
RPM XXXX KPH XXX    Engine RPM and Vehicle KPH display.
TRIP KM   XXXX.X    Kilometres travelled this trip.
FUEL LEVEL % XXX    Fuel tank level as % of full tank.
KM TO EMPTY  XXX    Kilometres to fuel tank empty.
AVERGE KPH  XX.X    Average speed in KPH for this trip.
T HH.MM  A HH.MM    Trip time and Actual time in hours and mins.
WAIT MINS XXX.XX    Time spent stopped-idling during trip.
BATT VOLTS XX.XX    Current vehicle battery voltage.
FUEL LITRES XX.X    Fuel tank fuel level in Litres.
INST L/HR  XX.XX    Fuel use instantaneous litres per hour.
INST L/100K XX.X    Fuel use instantaneous litres per 100 kms.
AVG L/100K  XX.X    Trip average fuel use  litres per 100 kms.
LTRS USED XXX.XX    Litres of fuel used on this trip.
ODOMETR XXXXXX.X    Autolog odometer to tenth kms.
DISTANCE XXXXXXX    Trip distance in metres.
[ VEHICLE DATA >    Menu group heading.

Where X is a number 0 - 9, generally leading zeros are suppressed.
```

During any of these display-only displays both the overspeed warning system and the display backlight level control functions are active on the keyboard buttons. See sections 2.10, 2.20.

3.30 O'SPEED MON menu items.

This menu group allows the overspeed warning settings to be examined and the overspeed increment/decrement value and vehicle-at-start-up (initial) constants to be altered. If the overspeed alarm is ON, an overspeed alarm sounds if the overspeed target speed is exceeded. Depressions of the ITEM button will rotate the display through the following menu items: -

```
O'SPEED KPH   XX    The overspeed alarm target speed.
O'SPEED STAT  SS    The ON/OFF state of the overspeed alarm.
O'SPEED INC   XX    The increment/decrement constant (5 or 10 KPH).
INITIAL STAT  SS    The initial start-up state of the overspeed alarm (on/off)
INITIAL KPH   XX    The initial overspeed alarm speed setting (30 to 195 kph)
[ O'SPEED MON  >    Menu group heading.

Where X is a number 0 - 9 and SS is ON for ON and OF for OFF
```

The overspeed alarm speed may be incremented/decremented by the amount of the incrementer /decrementer constant using the PLUS and MINUS buttons.

The overspeed alarm may be toggled OFF/ON by pressing the GROUP and ACK buttons together.

The overspeed incrementer/decrementer value may be changed when in the 'O'SPEED INC' menu item, similarly the initial at-vehicle-start-up condition of the overspeed alarm may be set from the 'INITIAL STAT' or 'INITIAL KPH' menu items. This is done by pressing GROUP and ACK together, this causes a flashing cursor to appear, then either the PLUS or MINUS buttons may be used to select a new value from the allowable values, the cursor position is controlled by depressing either the PLUS or MINUS buttons simultaneously with the ITEM button. To validate the selection press ACK, or to exit with no change to the value press ITEM.

See also section 2.10 which deals with the overspeed warning system when the display is not in the '[O'SPEED MON >' menu group.

3.40 RESETABLES   menu items.

This menu group provides a number of user resetable trip meters, fuel use meters, service interval alarms, a calendar date alarm, a resetable distance meter measuring distance travelled in metres and a resetable distance meter that counts Speedo sender impulses (odometer ticks). Depressions of the ITEM button will rotate the display through the following menu items: -

```
TRIP_1   XXXXX.X     Trip meter no. 1 (kms).
TRIP_2   XXXXX.X     Trip meter no. 2 (kms).
TRIP_3   XXXXX.X     Trip meter no. 3 (kms).
TRIP_4   XXXXX.X     Trip meter no. 4 (kms).
FUEL USE:XXXX.XL     Fuel use and distance since reset. *
FUEL TOT:XXXX.XL     Fuel use and distance since reset. *
 5000K AL XXXXXX     5000 km alarm target odometer.
 7500K AL XXXXXX     7500 km alarm target odometer.
10000K AL XXXXXX     10000 km alarm target odometer.
DATE AL DD/MM/YY     Calendar date alarm target date.
DISTANCE XXXXXXX     Resetable distance meter (metres).
ODOM TICKS XXXXX     Resetable Speedo/odometer sender impulse counter.
[ RESETABLES   >     Menu group heading.

Where X is a number 0 - 9, generally leading zeros are suppressed.
      DD is date in month, MM is month, YY is year.
```

* Note on FUEL USE/TOT displays.

Depressing either the PLUS or MINUS buttons will change these displays to and from the distance since reset forms: -

```
FUEL USE:XXXXXXK     Distance over which USE total occurred (kms).
FUEL TOT:XXXXXXK     Distance over which TOT total occurred (kms).
```

Resetting the counters: Counters, trip meters and fuel use meters are reset to zero by a two step procedure, firstly, pressing the GROUP and ACK buttons together, starts a flashing cursor. The user then can press the ACK button to validate the reset of the meter or press the ITEM button to abandon the change.

Setting the distance alarms: The 5000 km, 7500 km and 10000 km distance alarms can be set in either of two ways: -

(1) They may be set to sound an alarm when the current odometer plus the alarm distance is reached. This is done by pressing the GROUP and ACK buttons together which will make a cursor appear, then pressing the ACK button to validate the reset or the ITEM button to abandon the reset. After this type of reset, the alarm display will show a distance equal to the sum of the current odometer and the distance of the particular alarm.

(2) They may be set to sound an alarm when a user entered odometer reading is reached. This is done by pressing the GROUP and ACK buttons together to get the cursor, the digit under the cursor may be increased or decreased using the PLUS and MINUS buttons. The cursor may be moved forward or backward by pressing the ITEM button together with the PLUS or MINUS buttons. Once the desired odometer setting has been entered, the user may either press the ACK button to validate the reset or the ITEM button to abandon the change. A particular distance alarm may be disabled by setting it to zero.

Setting the date alarm: Proceed as for case (2) of the distance alarm setting procedure.

3.50 ALARMS   menu items.

This menu group allows the user to determine which alarms have occurred. Depressions of the ITEM button will rotate the display through the following menu items: -

```
ALARM: < type  >    Alarm type list (+ and - to examine list).
INTERNAL AL HHHH    Autolog internal software/system alarms.
[ ALARMS       >    Menu group heading.
```

Where < type > is the type of alarm condition present, the alarm types are as follows: -

```
  NO ALARMS    No alarms present.
   5000 KM     5000 km alarm odometer reached.
   7500 KM     7500 km alarm odometer reached.
  10000 KM     10000 km alarm odometer reached.
  BATT LOW     Autolog memory battery needs to be changed.
  CAL DATE     Calendar date-alarm date reached.
  LOG FULL     The trip logger memory is nearly full.
  INTERNAL     An Autolog internal system problem has been found.
  ** END **    The END of alarm list marker.
```

When in the 'ALARM: < type >' menu pressing either the PLUS or MINUS buttons will step forward or backward through the list of current alarms, after the last alarm is reached the '** END **' marker will appear.

If a 'BATT LOW' alarm occurs the user should print any logs in progress and go to his Autolog service centre to have the battery replaced. The battery in the Autolog unit should normally last over five years.

If an INTERNAL alarm is present the user should note the code appearing as 'HHHH' in the 'INTERNAL AL HHHH' menu item and refer the problem to his Autolog service centre. The internal alarm can be reset to zero by setting the four individual digits to zero, This is done by pressing the GROUP and ACK buttons together to get a cursor, this cursor can be moved forward and backward pressing the ITEM and either the PLUS or MINUS buttons together, the digit under the cursor can be altered using the PLUS and MINUS keys. The ACK button is used to validate the change and the ITEM button to abandon the change.

Alarms present at Autolog start-up: After the driver completes the 'DRIVER TRIP ACK?' start-up sequence (see 3.10), the presence of any alarm condition will sound a 'dit dah dit - dit dah dit' sound pattern once and the display will show the 'ALARM: < type >' menu item for one and a half seconds. The alarm type displayed will be the alarm of highest priority if there is more than one alarm present.

3.60 PERFORMANCE menu items.

This menu group allows the user to generate a performance graph of the vehicle speed and RPM during acceleration from rest to a user selectable terminal speed or distance. The maximum terminal speed available is 250 kph. (default at 100) and the terminal distance can be up to 1000 metres (default at 400). On each line of the performance graph the elapsed time, vehicle speed, engine rpm and distance travelled are printed. Depressions of the ITEM button will rotate the display through the following menu items: -

```
     O'SPEED STAT  SS        The on/off switch for the overspeed alarm.
     TARGET KPH    XXX       The end of test speed in kph.   (up to 250 kph)
     RUN NUMBER     R         The test run number 0 or 1,2,3
     0-TAR KPH  XX.XX        The actual test and result, XX.XX seconds.
     TARGET MTRS XXXX        The end of test target distance (up to 1000 metres)
     RUN NUMBER     R         The test run number 0 or 1,2,3
     0-TAR MTRS XX.XX        The actual test and result, XX.XX seconds
     PRINTER TYPE PPP        Printer selection for serial or parallel printer.
     PRINT:        ?         Printout control menu.
     [ PERFORMANCE  >        Menu group heading.


     Where  X is a number 0 - 9, generally leading zeros are suppressed
           SS is a switch showing ON = on, OF = off.
            R is a number 0 to 3 indicating run memory to be used.
          PPP is PAR for parallel printer or SER for serial printer.
```

To do a performance test first turn off the overspeed alarm by selecting the 'O'SPEED STAT' menu item and depressing the GROUP and ACK buttons simultaneously to obtain a cursor then use PLUS or MINUS to select 'OF' then depress ACK to confirm the change, then proceed as follows: -

(1) Select the desired end of test Speed / Distance.

The default 'TARGET KPH XXX' is 100 kph, the default ' TARGET MTRS' is 400 metres, if some other target is required it must be set by pressing the GROUP and ACK buttons together to obtain a cursor, this cursor can be moved forward or backwards by pressing the ITEM button together with the PLUS or MINUS buttons, the digit under the cursor can be altered using the PLUS and MINUS buttons, once the required value is set, press the ACK button to validate it or the ITEM button to abandon the change.

(2) Select the run number

Enter the 'RUN NUMBER R' menu item, this allows the user to set a timing only performance run (0) or a recorded data performance run (1,2,3) Each non-zero run number has its own run data memory. Each time the 'RUN NUMBER R' menu is entered the current run number is displayed. The number can be changed by pressing GROUP and ACK together to obtain a cursor, then selecting the required number using either the PLUS or MINUS buttons. The new number is confirmed using the ACK button or the change may be abandoned using the ITEM button.

3.60 PERFORMANCE menu items (continued).

(3) Start the test.

Enter the '0-TAR KPH XX.XX' or '0-TAR MTRS XX.XX' menu item then press the GROUP and ACK buttons together, the cursor will appear showing that the test is now armed. Stop the vehicle where you want to commence the test then press ACK, the Autolog will now beep once a second awaiting vehicle motion, as soon as vehicle motion is detected beeping will stop and the time display will start to accumulate elapsed time until the test is ended either by reaching the target speed or the passing of thirty seconds. The Autolog beeper will sound once when the test ends. The time display reads in seconds elapsed since vehicle motion started.

(4) Printing the results.

Enter the 'PRINTER TYPE PPP' menu and if necessary select the printer type attached to the Autolog , SER for a RS232 serial printer or computer serial port, PAR for a centronics interface parallel printer driven by the Autolog parallel interface adapter. To change the printer type press GROUP and ACK together to get the cursor then press PLUS or MINUS to select the required type. Confirm the selection by pressing ACK or abort the change by pressing ITEM.

Enter the 'PRINT: ?' menu item, then using the PLUS or MINUS buttons select 'RUN1_GPH' to print the performance graph for the run 1 memory, 'RUN2_GPH' to print the performance graph for the run 2 memory, 'RUN3_GPH' to print the performance graph for the run 3 memory,   'DATA_DMP' to dump the raw memory data or the '?' to stop a currently-printing printout. Then press the GROUP and ACK buttons together this starts a flashing cursor, then press ACK to validate the selected print function or ITEM to abandon the selected print function. The foregoing instructions assume that a printer is connected to the Autolog printer port and that the printer has adequate paper and is 'on-line'. (See APPENDIX A for a sample printout).

3.70 TRIP LOGGER menu items.

This menu group allows the user to set-up data and control parameters for the trip logger, examine the state of the trip logger memory, enter the password and print log reports. A valid password is required to set or alter any items in this menu group. Depressions of the ITEM button will rotate the display through the following menu items: -

```
    NO OF TRIPS XXXX    Number of trips recorded. *
    ST DATE NNDDMMYY    Starting day and date of the trip log. *
    PASSWORD ?  ????    Password entry menu item.
    PRINTER TYPE PPP    Printer selection for serial or parallel printer.
    PRINT LOG:     ?    Log printout menu item.
    RESET LOG     ??    Log reset/initialise menu item.
    REG NO  AAAAAAAA    Vehicle registration no menu item.
    DRIVERS : AAAAAA    Table of driver names/codes.
    TRP TYPS: AAAAAA    Table of trip types/codes.
    TIME DWELL   XXX    Stopped time before new log entry.
    DIST DWELL   XXX    Distance before new log entry.
    LOG TYPE      LT    Type of log being recorded.
    TRIPS LEFT  XXXX    Trip space left in log memory. *
    FULL ALARM % XXX    Fullness of log memory before alarm given.
    PRINT CTL:  HHHH    Printer control escape sequence string.
    [ TRIP LOGGER  >    Menu group heading.

  Where :-   X    is a number 0 - 9 usually leading zeros are suppressed.
            NN    is the number of a day ( Monday = 01 ).
            DD    is the date in the month ( 01 - 31 ).
            MM    is the month number ( 01 - 12 ).
            YY    is the low digits of the year number ( e.g. 96 ).
             A    is a alphanumeric character. (0 - 9, A - Z)
            LT    is a two character log type code (NO,EX,ST).
             H    is a hexadecimal number (0 - F)
          ????    represents the password validity code (???? or -OK-).
           PPP    is PAR for parallel printer SER for a RS232 serial printer.
             *    is a display-only, non user alterable menu item.
```

3.71 Trip logger menu item descriptions.

NO OF TRIPS XXXX : This item shows the number of trips recorded in the log since the logger was initialised. This item is automatically updated and is a display-only item.

ST DATE NNDDMMYY : This item shows the day and date that the trip logger was initialised (RESET). This item is automatically initialised anytime that the logger is reset and is a display-only item.

3.71 Trip logger menu item descriptions (continued).

   PASSWORD ? ???? : This is a Password entry menu item to allow the user to enter the password required before data items can be altered or reports printed. A valid password displays as 'PASSWORD ? -OK-' (see also 5.00).

   PRINTER TYPE PPP : This menu item allows the printer type selection to be changed if necessary ; SER for an RS232 serial printer or computer serial port, PAR for a centronics interface parallel printer driven by the Autolog parallel interface adapter. To change the printer type press GROUP and ACK together to get the cursor then press PLUS or MINUS to select the required type. Confirm the selection by pressing ACK or abandon the change by pressing ITEM.

   PRINT LOG: ? : This item allows the user to print a trip log report. There are several types of log reports available for printing. The report type to be printed is selected by use of the PLUS or MINUS buttons. After selecting the report type, printing is started by pressing the GROUP and ACK buttons simultaneously to get the flashing cursor, and then depressing the ACK button.

   Printouts can be aborted by using either the PLUS or MINUS buttons to return to the '?' in the report type data field then pressing the GROUP and ACK buttons simultaneously to get the cursor, and then depressing the ACK button.

   The log report types available are : -

```
     TAX_DT      FBT type report with driver name and trip type codes.
     TAX_BL      FBT type report without driver name and trip type codes.
     EXT_DT      Fleet owner report with driver name and trip type codes.
     SYSTST      Autolog system test report.
     DMP_LO      Dump of raw log data entries for external processing.
     DMP_RA      Problem report, debug dump of Autolog internal variables.]
     PRTEST      Printer test pattern, prints all printable characters in all columns.
         ?       Abort currently printing report.
```

   See APPENDIX B for sample trip log report printouts.

   All report types are always available for printing, however, data availability for all fields of any report type depends on the setting of the 'LOG TYPE   LT' menu item below. There are three settings for log data accumulation in the 'LOG TYPE' menu item, these control how much memory is used by each log entry. This control is exercised by omitting various data from each log entry in order allow more log entries before the available memory is full. The following table shows the compatibility between 'LOG TYPES' and report types : -

   Log type.   Report type.

	TAX_XX	EXT_DT	SYSTST
NO (normal)	X		
EX (extended)	X	X	
ST (system test)	X	X	X

   X denotes no missing (blank) data fields.

3.71 Trip logger menu item descriptions (continued).

The 'LOG TYPE' may be changed during the time a log is accumulating to preserve logger memory space. This will have no effect on the ability to print any report type; the 'LOG TYPE' changes may show up as blank data fields in some parts of some log reports.

RESET LOG   ?? : This menu item allows the trip logger to be reset. Upon reset, the trip logger memory is cleared and the current day number and date will display as the 'START DATE NNDDMMYY' menu item data. To reset the logger The user must enter the letters 'OK' at the position of the '??' on the display, Then press the ACK button. Section 4.00 describes how to enter user data.

REG NO AAAAAAAA : This menu item displays the vehicle registration number that will appear on all printed reports. The user may enter alphanumeric characters or a space into any of the eight user alterable character positions. Section 4.00 describes how to enter the required user data.

DRIVERS : AAAAAA : This menu item is a multi-item data set containing eight six character driver names or codes. The user can enter alphanumeric characters or a space into any character position. This data then forms the driver name/code table available to the driver when setting the driver name for the trip (see 3.10). Section 4.00 describes how to enter the required user data.

TRP TYPS: AAAAAA : This menu item is a multi-item data set containing eight six character trip types or codes. The user can enter alphanumeric characters or a space into any character position. This data then forms the trip type/code table available to the driver when setting the trip type for the trip (see 3.10). Section 4.00 describes how to enter the required user data.

TIME DWELL   XXX : This menu item allows the user to set-up a time that the vehicle can be stopped with the ignition off before the trip logger considers that the next trip is a new log entry. This feature allows the user to make short stops in a trip without starting a new log entry each time the trip is recommenced. The 'XXX' data field is in minutes. The default setting is 0 minutes. Section 4.00 describes how to enter the required user data.

DIST DWELL   XXX : This menu item allows the user to set-up a minimum distance the vehicle must travel before vehicle movement is considered by the logger to be a trip. This feature allows short vehicle positioning movements to be made without generating logger entries. The 'XXX' data field is in metres. A distance dwell of zero will create a log entry every engine start. The default setting is 100 metres. Section 4.00 describes how to enter the required user data.

3.71 Trip logger menu item descriptions (continued).

   LOG TYPE   LT : This menu item allows the user to control how many trips will fit into the trip logger memory. There are three types of log data accumulation modes and all three types may be mixed during any trip logging time period. The modes are: -

      NO   normal mode, uses least memory.
      EX   extended mode, uses more memory.
      ST   system test mode, uses most memory.

    The results of selections of log type will be displayed in the 'TRIPS LEFT XXXX' menu item as differences in the number of trips left before the logger memory is full. Section 4.00 describes how to enter the required user data.

   TRIPS LEFT XXXX : This menu item shows how many trips can be made using the current 'LOG TYPE' before the logger memory becomes full. The 'LOG TYPE' setting will influence the number of trips left at all times. This is a display-only menu item.

   FULL ALARM % XXX : This menu item allows the user to be warned by the alarm system when the logger memory has filled to a certain level. The level is expressed in percent of logger memory capacity and may be set between 1 and 100 percent. Once the user set level has been reached a 'LOG FULL' alarm will be generated on Autolog start-up (see 3.50). Section 4.00 describes how to enter the required user data.

   PRINT CTL: HHHH : This menu item allows the user to set-up a string of twelve characters to be sent to the printer prior to the printing of any report. This character string is displayed and entered as six groups of hexadecimal character pairs. The data is a multi-item set and has a default setting of 20h (space) for all characters. This print control string may be used to set the printer into the required mode and character size to suit the 132-column format used by the Autolog printed reports. Section 4.00 describes how to enter the required user data.

3.80 SETUP & CALS menu items.

This menu group allows the user to set the time, the date and vehicle constants required to allow the Autolog to make accurate computations. A valid password is required to set or alter any items in this menu group. Depressions of the ITEM button will rotate the display through the following menu items : -

```
PASSWORD ?  ????    Password entry menu item.
DL SAVING      DS    Daylight savings time ON/OFF menu item.
TIME DS HH:MI:SS    Time of day setting menu item.
DATE DN:DD/MM/YY    Day and date setting menu item.
ENGINE CYLS     X    Setting engine cylinders menu item.
FUEL TANK CAP XX    Setting fuel tank capacity menu item.
ODOMETR XXXXXX.X    Setting Autolog odometer menu item.
CLOCK CAL S XX M    Setting time clock calibration menu item.
SPEEDO CAL    XXX    Setting speedometer calibration menu item.
ODOM CAL    XXXXX    Setting odometer calibration menu item.
FLOW CAL      XXX    Setting fuel flow calibration menu item.
VOLTS CAL    XXXX    Setting Voltmeter calibration menu item.
FUEL LT:XXX% XXX    Setting fuel tank level calibration table.
[ SETUP & CALS >    Menu group heading.

Where :-   X    is a number 0 - 9, usually leading zeros are suppressed.
          DS    is daylight saving code, DS=daylight savings, NO=normal.
          HH    is the hour of day (24 hr format, 00 to 23 ).
          MI    is the minute in the hour ( 00 - 59 ).
          SS    is the second the minute ( 00 - 59 ).
          DN    is the day name MO,TU,WE,TH,FR,SA,SU.
          DD    is the date in month ( 01 - 31 ).
          MM    is the month number  ( 01 - 12 ).
          YY    is the least two digits of the year number (e.g. 96).
           S    is the + or - sign of the calibration number.
           M    is the mode T=test N=normal.
        ????    represents the password validity code (???? or -OK-).
```

3.81 Set-up & cals menu item descriptions.

PASSWORD ? ???? : This is a Password entry menu item to allow the user to enter the password required before data items can be altered or reports printed.

A valid password displays as 'PASSWORD ? -OK-' (see also 5.00).

3.81 Set-up & cals menu item descriptions (continued).

    DL SAVING   DS : This menu item allows the user to turn daylight savings time ON and OFF without having to reset the time of day. The 'DS' field behaves as a switch and can only take on the two values, 'NO' for normal time and 'DS' for daylight saving time.

   For user modification purposes the 'DS' field behaves as a character pair selected from the leftmost cursor position using the PLUS or MINUS buttons. Section 4.00 describes how to select the required value. This as well as any other adjustment to the time or date should be done prior to the first trip of the day. The vehicle ignition should be turned off immediately after the adjustment so that the first trip for the day starts with the new time/date setting.

    TIME DS HH:MI:SS : This menu item allows the user to set or inspect the Autolog time of day clock. The 'DS' field is set to 'DS' if the time being entered is daylight savings time or 'NO' if not. Each digit of the hour (HH), minute (MI) and second (SS) can be set individually. Section 4.00 describes how to enter the required user data.

    DATE DN:DD/MM/YY : This menu item allows the user to set or inspect the Autolog calendar date. The 'DN' field contains a two character abbreviation of the day name selectable from a table of valid names. Each digit of the day (DD), month (MM) and year (YY) can be set individually. Section 4.00 describes how to enter the required user data.

    ENGINE CYLS   X : This menu item allows the user to set or inspect the Autolog parameter for the number of cylinders in the vehicle engine. This is a single number being 4,6 or 8. Section 4.00 describes how to enter the required user data.

    FUEL TANK CAP XX : This menu item allows the user to set or inspect the Autolog parameter for the capacity of the vehicle fuel tank. The value is expressed in litres. This parameter is a digit pair selectable from a table of valid values. Section 4.00 describes how to enter the required user data.

    ODOMETR XXXXXX.X : This menu item allows the user to set or inspect the Autolog vehicle distance travelled odometer. This odometer data is expressed in kilometres and may be set to any arbitrary number, however, it is usually set to synchronise with the vehicles own odometer. This odometer can be calibrated to suit non-standard vehicles or wheels, or to track the existing vehicle odometer.

   The calibration is independent of the speedometer and is adjusted in the 'ODOM CAL   XXXXX' menu item. It is generally impossible to track vehicle manufacturers electromechanical odometers perfectly but tracking accuracy of better than 1 kilometre in 1000 is usual. Section 4.00 describes how to enter the required user data.

3.81 Set-up & cals menu item descriptions (continued).

CLOCK CAL S XX M : This menu item allows the user to set or inspect the Autolog time of day clock calibration factor. It is possible to calibrate the accuracy of the Autolog time of day clock in steps of plus or minus ten seconds per month. The 'S' field is the sign of the correction (+,-) and 'XX' is a correction factor between 0 and 32. The 'M' (maintenance) field should be set to 'N' and is only used by Autolog servicemen to set the clock into a test mode. Section 4.00 describes how to enter the required user data.

SPEEDO CAL   XXX : This menu item allows the user to set or inspect the speedometer calibration factor. This calibration allows the Autolog speedometer to be set to give accurate speed-readings in non-standard vehicles or with special wheels or tyres. The data in this menu item is the number of Speedo sender impulses per one tenth kilometre, the default setting is 625 corresponding to 62500 impulses per 10 kilometres.

The factor for a non-standard vehicle can be determined by travelling 10 kilometres against highway distance signposts after having reset the 'ODOM TICKS' counter item in the '[RESETABLES >', menu group at the first signpost. At the signpost where 10 kilometres has been travelled read the 'ODOM TICKS' count. This count divided by 100 will be the required Speedo calibration factor. Section 4.00 describes how to enter the required user data.

ODOM CAL   XXXXX : This menu item allows the user to set or inspect the odometer calibration factor. This calibration allows the Autolog odometer to be set to give accurate distance readings. The data in this menu item is the number of Speedo sender impulses per ten kilometres, the default setting is 62260 corresponding to 62260 impulses per 10 kilometres.

The calibration factor for a vehicle can be determined by travelling 10 kilometres against highway distance signposts after having reset the 'ODOM TICKS' counter item in the ' [RESETABLES > ', menu group at the first signpost. At the signpost where 10 kilometres has been travelled read the 'ODOM TICKS' count. This count will be the required odometer calibration factor.

If the calibration aim is to track an existing odometer this is done by multiplying the old calibration factor by the number produced by dividing an Autolog odometer distance travelled by a vehicle odometer distance travelled, this gives the new calibration factor.

$$\text{new CAL} = \text{old CAL} \times \frac{\text{Autolog distance travelled}}{\text{Vehicle distance travelled}}$$

The accuracy of a tracking calibration done this way will depend on the distance used to accumulate the distance difference between the odometers; the greater the distance travelled the greater the accuracy. Section 4.00 describes how to enter the required user data.

3.81 Set-up & cals menu item descriptions (continued).

FLOW CAL   XXX   : This menu item allows the user to set or inspect the fuel flow measurement calibration constant. This constant is used by the Autolog computer in calculations to do with fuel consumption and influences litres/hour, litres/100 km and fuel used computations. The default constant is a value of 538.

Accurate adjustment of this constant for a given vehicle will require that the user keep track of the fuel put into the vehicle at the pump over about ten fuel fills. This figure is used in conjunction with the Autolog 'FUEL TOT:' item total (in the RESETABLES menu group) accumulated over the same time to form a correction multiplier for the fuel flow calibration factor.

The following formula will compute the value of the new fuel flow calibration constant (FLOW CAL) from the actual fuel used (ACTUAL) and the Autolog version of fuel used (FUEL TOT), section 4.00 describes how to enter the new fuel flow calibration constant :-

$$\text{new FLOW CAL} = \frac{\text{FUEL TOT}}{\text{ACTUAL}} \times \text{old FLOW CAL}$$

VOLTS CAL   XXXX   : This menu item allows the user to set or inspect the voltage calibration constant used by the Autolog computer in calculating voltages. This calibration constant has a default value of 1961 but may be adjusted at the Autolog factory. Calculation of new values for this constant requires special test equipment and is best left to your Autolog service centre. User setting of this constant is not normally advised. Section 4.00 describes how to enter the required user data.

FUEL LT:XXX% XXX   : This menu item allows the user to set or inspect the fuel tank level interpolation table. This table provides the Autolog with the calibration settings that represent fuel tank levels from empty to full at 10 % fuel level increments. There are eleven values in this multi-item set they are 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90% and 100%

The default calibration will be roughly correct, however, the user can set this table to suit his own vehicle or purposes. The table is set by first allowing the vehicle to run out of fuel while idling on a level surface. The readings from the 'TANK CAL NO' menu item (in the '[MAINTENANCE >' menu group) are then noted, first at empty, then 30 seconds after each successive 10%-of-a-tank quantity of fuel is added to fill the tank. This requires accurate and safe measurements of fuel and cannot be done very accurately using the metering on a normal service station fuel pump.

The resulting eleven values are the values to be entered into the rightmost 'XXX' field in the 'FUEL LT:XXX% XXX' multi-item menu item. The entry sequence starts at 'FUEL LT: 0% XXX' and ends at 'FUEL LT:100% XXX' as the user steps through the level table items. Section 4.00 describes how to enter the required user data.

3.90 MAINTENANCE menu items.

This menu group provides information to assist in the fast verification of correct installation of the Autolog unit in a vehicle, it provides access to raw data readings from the vehicle transducers supplying information to the Autolog unit. This menu group also provides a method of restoring the default settings and calibrations that were present when the Autolog unit was new. A valid password is required to set or alter any items in this menu group. Depressions of the ITEM button will rotate the display through the following menu items : -

```
    FUEL LEVEL % XXX    Undamped raw fuel tank level.
    TANK CAL NO  XXX    Cal number representing current tank level.
    TANK VOLTS XX.XX    Current fuel tank sender output voltage.
    LTRS USED XXXX.X    Total litres of fuel used to date.
    MAX KPH      XXX    Maximum KPH on this trip.
    MAX RPM     XXXX    Maximum RPM on this trip
    MAX L/HR   XX.XX    Maximum litres/hour fuel flow on this trip.
    MIN VBAT   XX.XX    Minimum vehicle battery voltage on this trip.
    # SSSSSSSS SW.RV    Autolog serial number and software rev level.
    PASSWORD ?  ????    Password entry menu item.
    SET DEFAULTS  ??    Setting default calibration etc menu item.
    [ MAINTENANCE  >    Menu group heading.

  Where :-    X  is a number 0 - 9, usually leading zeros are suppressed.
        SSSSSS  is the Autolog 8 digit serial number.
         SW.RV  is the current software revision level.
          ????  represents the password validity code (???? or -OK-).
```

3.91 Maintenance menu item descriptions.

FUEL LEVEL % XXX : This menu item provides a percentage-full fuel gauge with a faster response time than the fuel gauge provided in the trip-computer '[VEHICLE DATA >' menu group. This gauge may be used whilst filling the fuel tank to 100% without overflow or for maintenance purposes. This is a display-only menu item.

TANK CAL NO XXX : This menu item shows the fuel level table calibration number for the current fuel level in the tank. The fuel tank level table can be user customised using readings from this menu item, read as the fuel tank is filled in 10% steps from empty to full. See section 3.81 (FUEL LT:XXX% XXX) for calibration procedure. This is a display-only menu item.

TANK VOLTS XX.XX : This menu item displays the fuel level sender transducer output voltage and is used to verify correct operation of the fuel level sender when the Autolog unit is installed. This is a display-only menu item.

3.91 Maintenance menu item descriptions (continued).

LTRS USED XXXX.X : This menu item displays the total no of litres of fuel the vehicle has consumed since the Autolog unit was installed. This display can be reset to zero. This display should not be reset during a vehicle trip logging period or when the FUEL USE of FUEL TOT meters in the RESETABLE menu group are in use. On reset of this display the Autolog unit will restart as if the ignition has just been turned on. This display is reset by simultaneously depressing GROUP and ACK to get the cursor, then depressing either ACK to verify the reset or ITEM to abandon the reset.

MAX KPH   XXX : This menu item displays a maximum speed reached by the vehicle on the current trip. This speed is calculated from raw speed sender transducer data without intermediate processing and is not very accurate. The purpose of this menu item is to allow the installer or user to check for problems in the Speedo sender and its wiring to the Autolog. Problems will show up as ridiculously low or high speeds being reached. This is a display-only menu item.

MAX RPM   XXXX : This menu item displays a maximum RPM reached by the vehicle on the current trip. This RPM is calculated from raw RPM sender transducer data without intermediate processing and is not very accurate. The purpose of this menu item is to allow the installer or user to check for problems in the RPM sender and its wiring to the Autolog. Problems will show up as ridiculously low or high RPM being reached. This is a display-only menu item.

MAX L/HR XX.XX : This menu item displays a maximum fuel flow (litres per hour) reached by the vehicle on the current trip. This flow is calculated from raw flow sender transducer data without intermediate processing and is not very accurate. The purpose of this menu item is to allow the installer or user to check for problems in the flow sender and its wiring to the Autolog. Problems will show up as ridiculously low or high fuel flows being reached. This is a display-only menu item.

MIN VBAT   XX.XX : This menu item displays the minimum vehicle battery voltage on this trip. This display allows the user to monitor the condition of the vehicle battery and the installer to verify that the Autolog unit is connected to an adequate power circuit within the vehicle. Power or battery problems will show up as unusually low voltage readings at various times. This is a display-only menu item.

SSSSSSSS SW.RV : This menu item allows inspection of the Autolog serial number and software revision level. This is a display-only menu item.

PASSWORD ? ???? : This is a Password entry menu item to allow the user to enter the password required before data items can be altered or reports printed. A valid password displays as 'PASSWORD ? -OK-' (see also 5.00).

SET DEFAULTS ?? : This menu item will restore all factory default calibration and data into the Autolog user alterable memory locations. All existing user alterable data is replaced by the defaults, this includes trip types, driver names and vehicle rego numbers etc. To perform a restore the user must enter the letters 'OK' at the position of the '??' on the display, then press the ACK button. Section 4.00 describes how to enter the required user data.

4.00 Inputting user data to menu items.

Most menu items which allow user set-up of Autolog calibration constants and operational parameters will require the Autolog password to be valid. Once the valid password has been entered any number of alterations can be made to data items without need to re-enter the password.

Selection of any 'PASSWORD ? ????' menu item will display 'PASSWORD ? -OK-' once a valid password has been entered. The password becomes invalid once the ignition switch is turned off, or the password is deliberately invalidated. See sect 5.00 for more details on password entry.

There are several steps to inputting user data into menu items, firstly the data item to be altered is selected (4.10), then the user starts the data alteration sequence (4.20) selecting and altering each individual data character as required, finally the user acknowledges that the data change is valid by pressing the ACK button, forcing the user edited data to replace the previous data.

4.10 Selecting the item for alteration.

Generally there will be only one item of data associated with a menu item, this data may be several characters long on the display but for alteration and input purposes it is considered to be one unit of data that can be altered in one edit transaction. To alter these single-item items of data the user only needs to select the required menu item by use of the ITEM button, and then start the data alteration sequence.

Menu items whose name ends with a colon ' **:** ' (e.g. DRIVERS: AAAAAA) are special. The colon denotes an item that has more than one data element, this data-set is called a multi-item item. When a multi-item is displayed the PLUS and MINUS buttons are available to allow the user to select a particular item in the multi-item set. The user can step forward (PLUS) or step backwards (MINUS) through the individual items of data belonging to the set. After selection, an individual data item in a multi-item set may be altered, this is done in exactly the same way as normal single-item item data; the user merely starts the data alteration sequence after the selection.

4.20 The data alteration sequence.

The data alteration sequence is started by pressing the GROUP and ACK buttons simultaneously, this action will produce a flashing rectangular cursor in the leftmost character position of the data field. If a password is required and the password is currently invalid the cursor will not appear. In some cases the cursor may appear on a blank position on the display because leading zeros on some menu item displays are suppressed, in these cases numbers may still be entered.

4.20 The data alteration sequence (continued).

After a flashing cursor is present, the character at the cursor position can be altered using the PLUS button and the MINUS button, the PLUS button advances the character to the next highest in sequence (i.e. A becomes B, 0 becomes 1), the MINUS button decreases the character to the next lowest in sequence (i.e. B becomes A, 9 becomes 8). In some cases the cursor will appear in the leftmost position of a character pair and the PLUS and MINUS buttons will select the next (PLUS) or previous (MINUS) character pair from a table of allowable character pairs.

The flashing cursor can be moved to other character positions by depressing the ITEM and PLUS buttons simultaneously to move right, or the ITEM and MINUS buttons simultaneously to move left. The cursor will wrap around from either end to the opposite end of the data field if it is moved beyond the data either way. Where the destination of the cursor is a character pair selectable from a table of valid pairs, only the leftmost character is a valid cursor position, both characters in the pair are selected from this cursor position.

Once the user has set-up each data character as required, depressing the ACK button will validate the change to the data and cause the data on the display to replace the original data. Even after the user has altered the data on the display the entered change can still be abandoned, this is done by pressing the ITEM button instead of the ACK button, this will exit the data alteration sequence restoring the display to its original data.

5.00 Entering the Autolog password.

Each Autolog unit has a unique 4-character password, this password must be entered before any data in the TRIP LOGGER, SETUP & CALS or MAINTENANCE menu groups can be altered, or any log report can be printed.

The menu groups requiring the use of a password have a menu item to allow the user to enter the password. Once a password is entered, it is valid for all menu groups and items.

To enter a password the user selects a 'PASSWORD ?   ????' menu item, then presses the GROUP and ACK buttons simultaneously to start a data alteration sequence (4.20), during this data alteration sequence the four characters of the password are entered, they are then validated by depressing the ACK button. A successful password entry will cause the password menu item to display 'PASSWORD ?   -OK-' indicating that the password is OK. An incorrect password entry attempt will cause the '????' to remain in the data field, three incorrect entry attempts will cause the Autolog unit to silently cease the processing of password entry attempts for a period of one hour.

If the Autolog appears not to accept a known good password, it could be that somebody has been attempting to enter an invalid password on some previous occasion, if this happens wait for one hour and retry the good password.

A valid password condition may be cancelled by the entry of an invalid password (e.g.'-OK-') whilst the password is valid. A valid password condition is also cancelled when the vehicle ignition is turned off.

The Autolog owner is cautioned not to leave the password in an easily recognisable form inside the vehicle.

6.00 Autolog Operation Hints and Tips.

After installation the following settings should be checked and adjusted by the user: -

1 Time and daylight savings flag
2 Date, month and year
3 Set the ENGINE CYLS
4 Set the FUEL TANK CAP
5 Set The ODOMETER
6 Zero the LITRES USED ('[MAINTENANCE >' menu)

Following the initial settings (1-6 above), the TRIP LOGGER menu items should then be set if the trip logger is to be used. When setting up the trip logger, set all the data items as required then perform a RESET LOG function, this will start a fresh trip log with all the new data.

Following the initial settings (1-6 above) the '[RESETABLES >' menu may be entered and the various trip meters and alarms may be set.

When the trip logger is active setting or resetting the time, date or daylight savings flag and any odometer corrections should be done prior to the first trip of the day. Turn the Ignition on, do the correction then turn the ignition off, this will ensure that the corrected values are used in the log for the first trip of the day.

7.00 Autolog Installation.

Installation of the Autolog requires that the Autolog unit is mechanically fixed to a suitable mounting point in the vehicle and that some connections are made to the vehicle electrical wiring loom.

On the left rear end of the Autolog case there is a 10-way modular jack which receives the electrical connections from the vehicle-wiring loom. These connections provide power to the Autolog unit when the vehicle ignition is on and provide access to the various signals within the vehicle-wiring loom that the Autolog computer needs to perform its functions. Terminal 1 of the jack is at the left-most end of the jack as you face the jack opening with the tab notch down. The connections to the 10-way jack and the jack cable wire colours are as follows: -

```
Wire     Terminal                   Signal

Silver      1         ALDL Control (if ALDL option fitted)
White       2         Power and signal return to vehicle negative loom rail.
Brown       3         Fuel gauge sender signal. (typically +4 to +9 volts)
Yellow      4         +12 volts via ignition switch (Autolog power).
Green       5         Speedo/Odometer sender signal. (0 to +10 volt pulses)
Red         6         Autolog case ground to vehicle body ground point.
Bronze      7         Fuel use PWM signal from vehicle engine computer.
Orange      8         Power and signal return to vehicle negative loom rail.
Lt Blue     9         Tacho signal to Tacho converter or vehicle engine computer.
Dk Blue    10         ALDL Data (if ALDL option fitted)
```

The power and ground return signals should come from an electrically quiet point in the vehicle wiring loom. The Autolog case ground is best connected by as short a wire as possible to a suitable grounding point on the vehicle body shell.

The Tacho input signal must NOT go directly to the Ignition coil primary winding tachometer point or to the vehicle tachometer wiring that connects to that point or damage to the Autolog electronics may result. If one of these Hot signals is the only Tacho signal available on the vehicle it must be converted by an Autolog 'signal converter board' before it enters the Autolog jack cable.

A Tacho 'signal converter board' is available from your Autolog supplier; this converter board is a small printed circuit board that has screw terminals for all the input signals required from the vehicle. Connection to the Autolog computer is by means of a cable supplied with the converter, which plugs into the converter board at one end and the Autolog computer at the other. This converter board can also be used for installations not requiring connection to a Hot tacho point as it provides a separate input for low voltage tacho signals, using this converter board gives the user the convenience of attaching the vehicle signals to a block of screw terminals that can be unplugged from the converter board.

After the installation set the trip logger to a 'LOG TYPE ST' so that system test log data is collected for a week or so. Also Inspect the maximum RPM/KPH/FLOW, MIN VBAT and TANK VOLTS readout's in the MAINTENANCE menu for wildly erroneous high or low values at the end of the initial test trip. (see section 3.91)

7.00 Autolog Installation (continued)

Using the Autolog signal converter board

Autolog Cable Connector
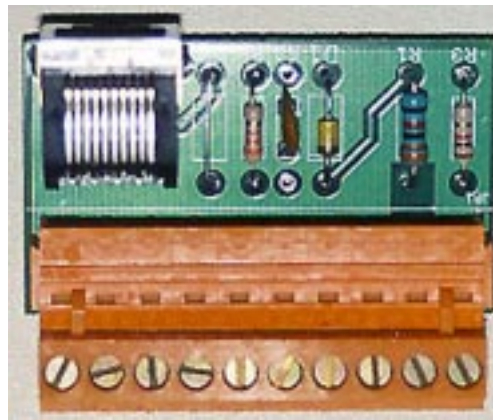
Main PCB

Terminal Plug

Terminal 1

Autolog Signal Converter Board

The connections to the Autolog signal converter board are as follows :-

```
Terminal No                   Connection in vehicle

     1            ALDL control (if ALDL option fitted)
     2            ALDL data    (if ALDL option fitted)
     3            Fuel Use, to ECU fuel flow PWM Output
     4            Vehicle Body Ground
     5            Speedo/Odometer sender
     6            Batt via Ignition switch (Autolog power)
     7            Fuel Gauge sender
     8            Power/Signal ground (Autolog power return)
     9            Tacho Hot (To ignition coil primary high voltage Tacho point)
    10            Tacho Cold (To low voltage Tacho sender)
```

Pins are numbered from left to right looking at the entry side of the terminal block with the screw heads facing upward.

The Tacho signal will go to either pin 9 or 10 depending on the type of Tacho signal available.

The wires to the signal converter board should be soldered to the appropriate wires going to the vehicle instrument cluster, the joints should then be wrapped with high temperature insulating tape, the wires should be kept short as possible, a multi-strand wire size of approx. 24/0.2 or similar should be used. It is preferable to tin (with solder) the ends of the wires that will be attached to the converter board screw terminals.

The Vehicle body ground wire should be attached to a ground point by a short multi-stranded wire of size 32/0.2 (1 sq. mm area).

The converter circuit board should be wrapped in thin plastic foam sheet and secured to the vehicle wiring loom with plastic cable ties.

The Autolog Printer Ports

The Autolog serial printer port operates at 9600 baud, the serial data is RS232 levels, eight bit, no parity. The Autolog output data stream follows X-on/X-off serial data communication protocol.

The Autolog parallel printer adapter has a cable that plugs into the polarised 8-way jack on the back of the Autolog case, this cable has an 8-way polarised connector at the Autolog end and a 6-way connector at the parallel printer adapter end. The printer adapter plugs directly into the 50-way centronics connector on the printer.

A printer cable with a D9 or D25 connector on the printer (or PC) end is available from your Autolog supplier. The cable plugs into the polarised 8-way jack on the back of the Autolog case.

The connections to the Autolog printer port are as follows: -

```
   Pin No                  Connection
     1          SPI BSCK*                      \
     2          SPI BMOSI*                     |      To Autolog Parallel
     3          SPI BPD5*                      |---   Printer Adapter
     4          SPI BMISO*                     |      Cable
     5          Power and Signal Return.\      |
     6          +12 Volts.(10 ma max)    |       /
     7          RS232 Input Signal.      |
     8          RS232 Output Signal.     / -------   To RS232 I/O cable
```

Terminal 1 of the jack is at the left-most end of the jack as you face the jack opening with the tab notch down.

The Autolog parallel printer adapter data lines are on pins 1 to 4, power and return is on pins 5 and 6. The RS232 signals are on pins 7 and 8 with signal return on pin 5. Pin 6 may be used to provide pull-up voltages to RS232 interface lines. Do not draw more than 10 ma. from pin 6.
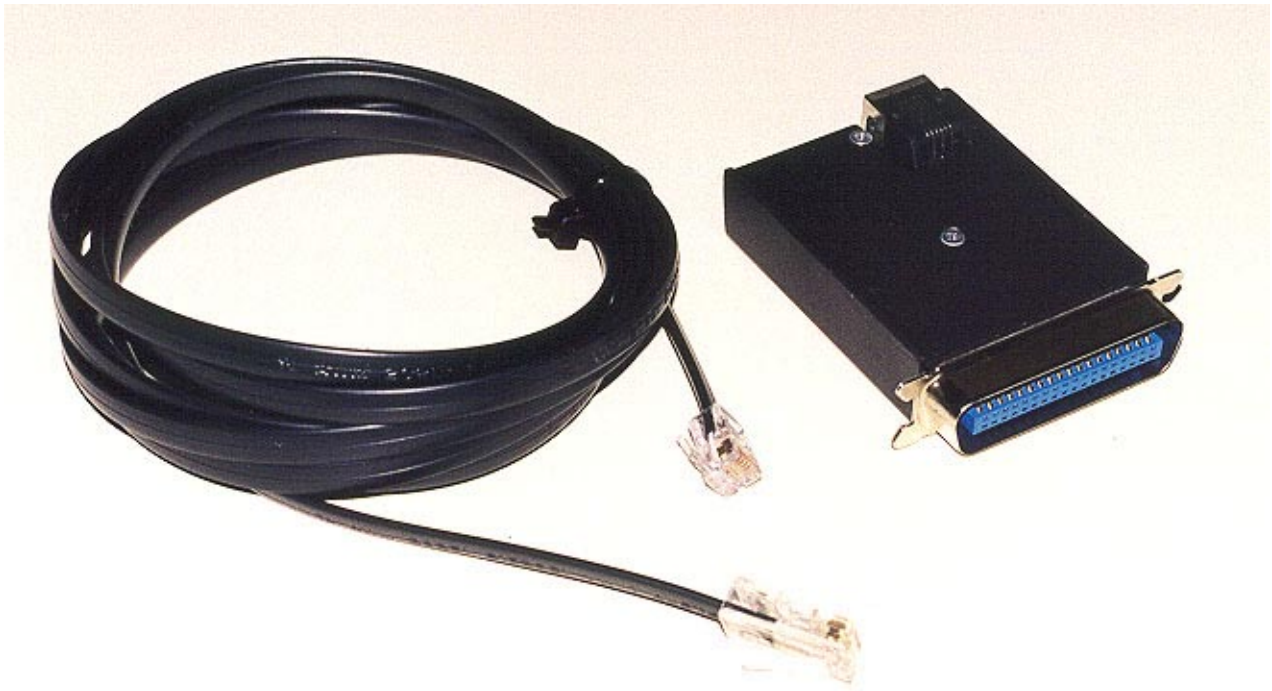
Autolog Parallel Printer Adapter

APPENDIX A - Sample performance graph printouts.

SAMPLE PERFORMANCE GRAPH.

(1) RUN1_GPH or RUN2_GPH or RUN3_GPH

Performance graph plotting RPM and KPH against elapsed time.
Time axis = 0.1 seconds per division.
RPM   = 100 RPM per division. (R)
KPH   = 1 KPH per division.   (K)

Columns

KPH   = Kilometres/hour.
RPM   = Engine revs per minute.
DIST   = Distance travelled in metres.

The same graph format is used for the 0 to target speed tests and 0 to target distance tests
the only difference is in how the test terminates (i.e. speed or distance travelled).

(2) DATA_DMP
Data Dump of raw performance graph data for use in
another Computer.

```
AUTOLOG 1000  PERFORMANCE REPORT FOR VEHICLE:SMP 893        LOGGER S/N: 16777215 01.00      PRINTED: 12/03/97        PAGE 01

| TIME | 0........1........2........3........4........5........6........7........8........9........ | KPH | RPM | DIST |
|  .1  | +--K-----+----R---+--------+--------+--------+--------+--------+--------+--------+-------- |   3 | 1650 |   0 |
|  .2  | +------K--+-----R-+--------+--------+--------+--------+--------+--------+--------+-------- |   7 | 1778 |   1 |
|  .3  | +------+-K-+-------R-+--------+--------+--------+--------+--------+--------+--------+------ |   8 | 1892 |   1 |
|  .4  | +--------+K-------R+--------+--------+--------+--------+--------+--------+--------+-------- |  11 | 1971 |   1 |
|  .5  | +--------+-K-----R+--------+--------+--------+--------+--------+--------+--------+-------- |  13 | 1975 |   1 |
|  .6  | +--------+---K---R--+--------+--------+--------+--------+--------+--------+--------+------- |  15 | 2051 |   2 |
|  .7  | +--------+-----K-+R--+--------+--------+--------+--------+--------+--------+--------+------ |  17 | 2111 |   2 |
|  .8  | +--------+------KR+--------+--------+--------+--------+--------+--------+--------+-------- |  20 | 2133 |   3 |
|  .9  | +--------+------+R+--------+--------+--------+--------+--------+--------+--------+-------- |  21 | 2187 |   4 |
| 1.0  | +--------+------+-R+--------+--------+--------+--------+--------+--------+--------+-------- |  22 | 2267 |   4 |
| 1.1  | +--------+------+--R-K---+--------+--------+--------+--------+--------+--------+-------- |  25 | 2337 |   5 |
| 1.2  | +--------+------+---R-K-+--------+--------+--------+--------+--------+--------+-------- |  26 | 2431 |   6 |
| 1.3  | +--------+------+----R---K+--------+--------+--------+--------+--------+--------+------- |  29 | 2520 |   6 |
| 1.4  | +--------+------+----R--K-+--------+--------+--------+--------+--------+--------+------- |  28 | 2589 |   7 |
| 1.5  | +--------+------+-----R--+K-+--------+--------+--------+--------+--------+--------+----- |  31 | 2713 |   8 |
| 1.6  | +--------+------+-----R-+-K-+--------+--------+--------+--------+--------+--------+---- |  32 | 2802 |   9 |
| 1.7  | +--------+------+------R+--K-+--------+--------+--------+--------+--------+--------+--- |  33 | 2906 |  10 |
| 1.8  | +--------+------+------R--K---+--------+--------+--------+--------+--------+--------+-- |  34 | 3048 |  11 |
| 1.9  | +--------+------+-------+R---K-+--------+--------+--------+--------+--------+-------- |  36 | 3140 |  12 |
| 2.0  | +--------+------+-------+-R----K+--------+--------+--------+--------+--------+-------- |  39 | 3249 |  13 |
| 2.1  | +--------+------+-------+--R---K+--------+--------+--------+--------+--------+-------- |  39 | 3378 |  14 |
| 2.2  | +--------+------+--------R----K-+--------+--------+--------+--------+--------+-------- |  40 | 3498 |  15 |
| 2.3  | +--------+------+--------+R--+--K---+--------+--------+--------+--------+--------+----- |  43 | 3619 |  16 |
| 2.4  | +--------+------+--------+-R-+--K---+--------+--------+--------+--------+--------+----- |  44 | 3720 |  18 |
| 2.5  | +--------+------+--------+-----R-+----K---+--------+--------+--------+--------+------- |  45 | 3834 |  19 |
| 2.6  | +--------+------+--------+------R+-----K---+--------+--------+--------+--------+------ |  46 | 3922 |  20 |
| 2.7  | +--------+------+--------+------R+-----K-+--------+--------+--------+--------+-------- |  48 | 3997 |  21 |
| 2.8  | +--------+------+--------+------+R-----K-+--------+--------+--------+--------+-------- |  48 | 4157 |  23 |
| 2.9  | +--------+------+--------+------+-R-----+K--+--------+--------+--------+--------+----- |  51 | 4213 |  24 |
| 3.0  | +--------+------+--------+--------R------K-+--------+--------+--------+--------+------ |  54 | 4360 |  26 |
| 3.1  | +--------+------+--------+--------R----+--K-+--------+--------+--------+--------+----- |  54 | 4496 |  27 |
| 3.2  | +--------+------+--------+--------+R---+--K---+--------+--------+--------+--------+--- |  55 | 4550 |  29 |
| 3.3  | +--------+------+--------+--------+-R---+---K-+--------+--------+--------+--------+--- |  57 | 4687 |  30 |
| 3.4  | +--------+------+--------+--------+--R--+-+--K-+--------+--------+--------+--------+-- |  58 | 4795 |  32 |
| 3.5  | +--------+------+--------+--------+---R--+----K+--------+--------+--------+--------+-- |  60 | 4870 |  33 |
| 3.6  | +--------+------+--------+--------+---R+-------K+--------+--------+--------+--------+- |  59 | 4960 |  35 |
| 3.7  | +--------+------+--------+--------+----R--+-----+K-+--------+--------+--------+------- |  62 | 4870 |  37 |
| 3.8  | +--------+------+--------+--------+-----+R--+-----+---K---+--------+--------+-------- |  63 | 4166 |  39 |
| 3.9  | +--------+------+--------+--------+------R--+-----+--------+---K---+--------+-------- |  65 | 3757 |  41 |
| 4.0  | +--------+------+--------+--------+-----R--+-----+--------+----K---+--------+------- |  67 | 3330 |  42 |
| 4.1  | +--------+------+--------+--------R------+-----+--------+-----K-+--------+--------+- |  68 | 3088 |  44 |
| 4.2  | +--------+------+--------+------+R-----+-----+--------+-----K-+--------+--------+-- |  68 | 3167 |  46 |
| 4.3  | +--------+------+--------+------+R-----+-----+--------+------K+--------+--------+-- |  69 | 3199 |  48 |
| 4.4  | +--------+------+--------+------+R-----+-----+--------+-------+K+--------+-------- |  71 | 3260 |  50 |
| 4.5  | +--------+------+--------+------+--R----+-----+--------+-------+-K-+--------+------ |  72 | 3318 |  52 |
| 4.6  | +--------+------+--------+------+--R----+-----+--------+-------K---+--------+----- |  73 | 3336 |  54 |
| 4.7  | +--------+------+--------+------+--R----+-----+--------+--------K-+--------+------ |  75 | 3372 |  56 |
| 4.8  | +--------+------+--------+------+--R----+-----+--------+--------K---+--------+---- |  76 | 3409 |  58 |
| 4.9  | +--------+------+--------+------+---R----+-----+--------+--------K-+--------+----- |  75 | 3485 |  60 |
| 5.0  | +--------+------+--------+------+---R----+-----+--------+--------K-+--------+----- |  77 | 3511 |  63 |
| 5.1  | +--------+------+--------+------+---R----+-----+--------+--------K---+--------+--- |  76 | 3544 |  65 |
| 5.2  | +--------+------+--------+------+----R---+-----+--------+--------K+--------+------ |  79 | 3605 |  67 |
| 5.3  | +--------+------+--------+--------+-----R---+-----+--------+--------K--------+-------- |  80 | 3640 |  69 |


AUTOLOG 1000  PERFORMANCE REPORT FOR VEHICLE:SMP 893        LOGGER S/N: 16777215 01.00      PRINTED: 12/03/97        PAGE 02

| TIME | 0........1........2........3........4........5........6........7........8........9........ | KPH | RPM | DIST |
| 5.4  | +--------+------+--------+--------+-----R---+-----+--------+--------+----+K-------+-------- |  81 | 3683 |  72 |
| 5.5  | +--------+------+--------+--------+------R--+-----+--------+--------+--------K-----+------- |  83 | 3742 |  74 |
| 5.6  | +--------+------+--------+--------+------R-+-----+--------+--------+--------K----+------- |  83 | 3765 |  76 |
| 5.7  | +--------+------+--------+--------+------R-+-----+--------+--------+--------K----+------- |  84 | 3765 |  78 |
| 5.8  | +--------+------+--------+--------+------R-+-----+--------+--------+--------K----+------- |  84 | 3803 |  81 |
| 5.9  | +--------+------+--------+--------+-------R+-----+--------+--------+--------+-K----+------ |  87 | 3906 |  83 |
| 6.0  | +--------+------+--------+--------+-------R+-----+--------+--------+--------+K--+------- |  86 | 3955 |  86 |
| 6.1  | +--------+------+--------+--------+-------R-+-----+--------+--------+--------K-+-------- |  88 | 3930 |  88 |
| 6.2  | +--------+------+--------+--------+-------R+-----+--------+--------+--------K+--------- |  89 | 3947 |  91 |
| 6.3  | +--------+------+--------+--------+--------R-+-----+--------+--------+--------K--------- |  90 | 4058 |  93 |
| 6.4  | +--------+------+--------+--------+--------R-+-----+--------+--------+--------K+--------- |  89 | 4058 |  96 |
| 6.5  | +--------+------+--------+--------+--------+R+-----+--------+--------+--------+K-------- |  91 | 4102 |  98 |
| 6.6  | +--------+------+--------+--------+--------+R-+-----+--------+--------+--------+--K----- |  93 | 4175 | 101 |
| 6.7  | +--------+------+--------+--------+--------+R-+-----+--------+--------+--------+-K------ |  92 | 4166 | 103 |
| 6.8  | +--------+------+--------+--------+--------+-R-+-----+--------+--------+--------+---K--- |  95 | 4222 | 106 |
| 6.9  | +--------+------+--------+--------+--------+-R-+-----+--------+--------+--------+----K-- |  97 | 4251 | 109 |
| 7.0  | +--------+------+--------+--------+--------+-R-+-----+--------+--------+--------+---K-- |  95 | 4290 | 112 |
| 7.1  | +--------+------+--------+--------+--------+--R-+-----+--------+--------+--------+----K-- |  97 | 4370 | 114 |
| 7.2  | +--------+------+--------+--------+--------+--R-+-----+--------+--------+--------+-------K |  99 | 4370 | 117 |
|      | K--------+------+--------+--------+--------R----+-----+--------+--------+--------+-------- | 100 | 4432 | 119 |
```

        MEASURED TIME 07.27 FOR RUN NO 2, RUN TYPE 0-KPH , ON 12/03 AT 10:40 HOURS.

              END OF REPORT   TIME 14:11

```
SH12 PERFORMANCE DATA 41
S12375C4585704700002796041E0001207703DF0001192503B70001155703B50001122FC7
S12375E4039200020FC1037800020E03036F00030D15035900040C3C033B00040B4003229D
S123760400050A9E03030006099202E8000609B602D4000708E802B3000808C4029D000961
S1237624085F0285000A080C0267000B07C40255000C07160241000D0730022B000E06DFD0
S12376440218000F06780206001006610_1F80012062401E9001305FD01DE001405DB01D51F
S1237664001505CE01C30017057D01BD0018051F01AE001A052401A1001B0515019C001D40
S123768404E80190001E04C90187002004AF0181002104B3017A002303F50181002504D0B4
S12376A401C20027044801F30029042A0233002A041D025F002C04150250002E0407024A44
S12376C4003003F0023F003203DD0235003403D20232003603BD022C003803A70226003A50
S12376E403DB021A003C039E0216003F03A902110041038602080043037B0203004503783B
S123770401FD0048035A01F5004A036201F2004C036901F2004E036401ED0051032401E07F
S12377240053034101DA0056032B01DD0058032601DB005B031A01CE005D032A01CE006010
S1237744031601C90062030501C10065030A01C2006702E601BC006A02D701B9006D02F273
S123776401B5007002FA01AD007202C701AD007502C901A70077000000000000000000E9
S1237784000000000000000000000000000000000000000000000000000000000000E1
S12377A4000000000000000000000000000000000000000000000000000000000000C1
S12377C400000000000000000000000000000000000000000000000000000000000A1
S12377E40000000000000000000000000000000000000000000000000000000000081
S123780400000000000000000000000000000000000000000000000000000000000060
S123782400000000000000000000000000000000000000000000000000000000000040
S123784400000000000000000000000000000000000000000000000000000000000020
S123786400000000000000000000000000000000000000000000000000000000000000
S12378840000000000000000000000000000000000000000000000000000000000000E0
S12378A40000000000000000000000000000000000000000000000000000000000000C0
S12378C40000000000000000000000000000000000000000000000000000000000000A0
S12378E4000000000000000000000000000000000000000000000000000000000000080
S123790400000000000000000000000000000000000000000000000000000000000005F
S12379240000000000000000000000000000000000000000000000000000000000003F
S12379440000000000000000000000000000000000000000000000000000000000001F
S1237964000000000000000000000000000000000000000000000000000000000000FF
S1237984000000000000000000000000000000000000000000000000000000000000DF
S12379A4000000000000000000000000000000000000000000000000000000000000BF
S12379C400000000000000000000000000000000000000000000000000000000000009F
S12379E40000000000000000000000000000000000000000000000000000000000007F
S1237A04000000000000000000000000000000000000000000000000000000000000005E
S1237A24000000000000000000000000000000000000000000000000000000000000003E
S1237A44000000000000000000000000000000000000000000000000000000000000001E
S1237A640000000000000000000000000000000000000000000000000000000000000FE
S1237A840000000000000000000000000000000000000000000000000000000000000DE
S1237AA40000000000000000000000000000000000000000000000000000000000000BE
S1237AC40000000000000000000000000000000000000000000000000000000000009E
S1237AE40000000000000000000000000000000000000000000000000000000000007E
S1237B040000000000000000000000000000000000000000000000000000000000005D
S1237B240000000000000000000000000000000000000000000000000000000000003D
S1237B440000000000000000000000000000000000000000000000000000000000001D
S1237B640000000000000000000000000000000000000000000000000000000000000FD
S1237B840000000000000000000000000000000000000000000000000000000000000DD
S1237BA40000000000000000000000000000000000000000000000000000000000000BD
S9030000FC
```

APPENDIX B - Sample trip log report printouts.

SAMPLE TRIP LOG PRINTOUTS.

(1) TAX_DT
F.B.T type log format showing for each trip :-
Start date, End date, Start KM, End KM, Trip KM,
Trip Type, Driver Name, Blank Driver signature field.

(2) TAX_BL
F.B.T type log format showing for each trip :-
Start date, End date, Start KM, End KM, Trip KM,
Blank Trip Type field, Blank Driver Name field,
Blank Driver signature field.

(3) EXT_DT
Extended Log format showing for each trip :-
Start date, End date, Start KM, End KM, Trip KM,
Start Time, End Time, Trip time, Waiting Time,
Fuel used, Fuel Remaining, Trip Type, Driver Name.

(4) SYSTST
System Test log format showing for each trip :-
Start date, Start KM, Trip KM, Start time, End Time,
Trip Time, Waiting time, Fuel used, Fuel remaining,
Maximum fuel flow, Maximum RPM, Maximum KPH,
Minimum battery Voltage.

(5) DMP_LO
Data Dump of raw log data, allowing log data to be used
in another computer.

(6) DMP_RA
Diagnostic Data Dump for Autolog service technicians.

AUTOLOG 1000   F.B.T LOG REPORT FOR VEHICLE:SMP 893   LOGGER S/N: 16777215 01.00   PRINTED: 24/11/95   PAGE 01

ST DATE	EN DATE	STRT KM	END KM	TRIP KM	TRIP TYP	DVR NAME	DVR SIGNATURE
28/10	28/10	94694	94695	1.2	BIZZ	A G F	
28/10	28/10	94695	94696	.3	BIZZ	A G F	
28/10	28/10	94696	94697	1.0	BIZZ	A G F	
28/10	28/10	94697	94728	31.1	BIZZ	A G F	
29/10	29/10	94728	94728	.6	BIZZ	A G F	
29/10	29/10	94728	94732	3.2	BIZZ	A G F	
29/10	29/10	94732	94735	3.1	BIZZ	A G F	
29/10	29/10	94735	94737	2.3	BIZZ	A G F	
29/10	29/10	94737	94739	2.0	BIZZ	A G F	
29/10	29/10	94739	94741	2.0	BIZZ	A G F	
29/10	29/10	94741	94742	.3	PRIV	A G F	
29/10	29/10	94742	94742	.3	PRIV	A G F	
30/10	30/10	94742	94774	31.7	BIZZ	A G F	
30/10	30/10	94774	94783	9.1	BIZZ	A G F	
30/10	30/10	94783	94785	2.3	BIZZ	A G F	
30/10	30/10	94785	94786	.2	BIZZ	A G F	
30/10	30/10	94786	94794	8.7	BIZZ	A G F	
30/10	30/10	94794	94804	10.0	BIZZ	A G F	
30/10	30/10	94804	94814	9.6	BIZZ	A G F	
30/10	30/10	94814	94825	11.1	BIZZ	A G F	
30/10	30/10	94825	94827	1.7	BIZZ	A G F	
30/10	30/10	94827	94827	.4	BIZZ	A G F	
30/10	30/10	94827	94829	1.3	BIZZ	A G F	
30/10	30/10	94829	94830	1.7	PRIV	A G F	
30/10	30/10	94830	94832	1.7	PRIV	A G F	
30/10	30/10	94832	94834	1.5	BIZZ	A G F	
31/10	31/10	94834	94835	1.2	BIZZ	A G F	
31/10	31/10	94835	94836	1.0	BIZZ	A G F	
31/10	31/10	94836	94838	1.7	BIZZ	A G F	
31/10	31/10	94838	94840	1.8	BIZZ	A G F	
31/10	31/10	94840	94841	1.5	BIZZ	A G F	
31/10	31/10	94841	94843	1.5	BIZZ	A G F	
31/10	31/10	94843	94856	12.9	BIZZ	A G F	
31/10	31/10	94856	94868	12.5	BIZZ	A G F	
01/11	01/11	94868	94873	4.7	BIZZ	A G F	
01/11	01/11	94873	94878	4.6	BIZZ	A G F	
01/11	01/11	94878	94909	31.1	BIZZ	A G F	
02/11	02/11	94909	94941	31.7	BIZZ	A G F	
02/11	02/11	94941	94942	1.3	PRIV	A G F	
02/11	02/11	94942	94943	1.3	PRIV	A G F	
02/11	02/11	94943	94945	1.4	BIZZ	A G F	
02/11	02/11	94945	94946	1.5	BIZZ	A G F	
02/11	02/11	94946	94957	10.7	BIZZ	A G F	
02/11	02/11	94957	94967	9.7	BIZZ	A G F	
02/11	02/11	94967	94967	.3	BIZZ	A G F	
02/11	02/11	94967	94967	.3	BIZZ	A G F	
03/11	03/11	94967	94969	1.1	PRIV	A G F	
03/11	03/11	94969	94970	1.1	PRIV	A G F	
04/11	04/11	94970	94970	.3	BIZZ	A G F	
04/11	04/11	94970	94970	.3	BIZZ	A G F	
04/11	04/11	94970	94972	1.2	BIZZ	A G F	
04/11	04/11	94972	94972	.3	BIZZ	A G F	
04/11	04/11	94972	94974	1.6	BIZZ	A G F	

AUTOLOG 1000   F.B.T LOG REPORT FOR VEHICLE:SMP 893   LOGGER S/N: 16777215 01.00   PRINTED: 24/11/95   PAGE 05

LOG START DATE : 28/10 END DATE : 24/11

TOTAL KM LOGGED :   1203.2

TOTAL KM FOR TRIP TYPE : BIZZ.   1002.5 -   83.3 % OF TOTAL KM.
TOTAL KM FOR TRIP TYPE : PRIV.   200.7 -   16.7 % OF TOTAL KM.
TOTAL KM FOR TRIP TYPE : ?   3   .0 -   .0 % OF TOTAL KM.
TOTAL KM FOR TRIP TYPE : ?   4   .0 -   .0 % OF TOTAL KM.
TOTAL KM FOR TRIP TYPE : ?   5   .0 -   .0 % OF TOTAL KM.
TOTAL KM FOR TRIP TYPE : ?   6   .0 -   .0 % OF TOTAL KM.
TOTAL KM FOR TRIP TYPE : ?   7   .0 -   .0 % OF TOTAL KM.
TOTAL KM FOR TRIP TYPE : VEH_MT   .0 -   .0 % OF TOTAL KM.

                    END OF REPORT   TIME 11:33

```
AUTOLOG 1000    F.B.T LOG REPORT FOR VEHICLE:SMP 893      LOGGER S/N: 16777215 01.00      PRINTED: 24/11/95      PAGE 01
```

ST DATE	EN DATE	STRT KM	END KM	TRIP KM	TRIP TYPE	DRIVER NAME	DVR SIGNATURE
SA 28/10	28/10	94694	94695	1.2			
SA 28/10	28/10	94695	94696	.3			
SA 28/10	28/10	94696	94697	1.0			
SA 28/10	28/10	94697	94728	31.1			
SU 29/10	29/10	94728	94728	.6			
SU 29/10	29/10	94728	94732	3.2			
SU 29/10	29/10	94732	94735	3.1			
SU 29/10	29/10	94735	94737	2.3			
SU 29/10	29/10	94737	94739	2.0			
SU 29/10	29/10	94739	94741	2.0			
SU 29/10	29/10	94741	94742	.3			
SU 29/10	29/10	94742	94742	.3			
MO 30/10	30/10	94742	94774	31.7			
MO 30/10	30/10	94774	94783	9.1			
MO 30/10	30/10	94783	94785	2.3			
MO 30/10	30/10	94785	94786	.2			
MO 30/10	30/10	94786	94794	8.7			
MO 30/10	30/10	94794	94804	10.0			
MO 30/10	30/10	94804	94814	9.6			
MO 30/10	30/10	94814	94825	11.1			
MO 30/10	30/10	94825	94827	1.7			
MO 30/10	30/10	94827	94827	.4			
MO 30/10	30/10	94827	94829	1.3			
MO 30/10	30/10	94829	94830	1.7			
MO 30/10	30/10	94830	94832	1.7			
MO 30/10	30/10	94832	94834	1.5			
TU 31/10	31/10	94834	94835	1.2			
TU 31/10	31/10	94835	94836	1.0			
TU 31/10	31/10	94836	94838	1.7			
TU 31/10	31/10	94838	94840	1.8			
TU 31/10	31/10	94840	94841	1.5			
TU 31/10	31/10	94841	94843	1.5			
TU 31/10	31/10	94843	94856	12.9			
TU 31/10	31/10	94856	94868	12.5			
WE 01/11	01/11	94868	94873	4.7			
WE 01/11	01/11	94873	94878	4.6			
WE 01/11	01/11	94878	94909	31.1			
TH 02/11	02/11	94909	94941	31.7			
TH 02/11	02/11	94941	94942	1.3			
TH 02/11	02/11	94942	94943	1.3			
TH 02/11	02/11	94943	94945	1.4			
TH 02/11	02/11	94945	94946	1.5			
TH 02/11	02/11	94946	94957	10.7			
TH 02/11	02/11	94957	94967	9.7			
TH 02/11	02/11	94967	94967	.3			
TH 02/11	02/11	94967	94967	.3			
FR 03/11	03/11	94967	94969	1.1			
FR 03/11	03/11	94969	94970	1.1			
SA 04/11	04/11	94970	94970	.3			
SA 04/11	04/11	94970	94970	.3			
SA 04/11	04/11	94970	94972	1.2			
SA 04/11	04/11	94972	94972	.3			
SA 04/11	04/11	94972	94974	1.6			

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AUTOLOG 1000 EXTENDED LOG REPORT FOR VEHICLE:SMP 893        LOGGER S/N: 16777215 01.00      PRINTED: 24/11/95      PAGE 01
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ST DATE	EN DATE	STRT KM	END KM	TRIP KM	ST TIME	EN TIME	TRP TME	WA TIME	FU USED	FU REM	TRIP TYP	DVR NAME
SA 28/10	28/10	94694	94695	1.2	10:53	10:56	00:03	.13	.87	78.40	BIZZ	A G F
SA 28/10	28/10	94695	94696	.3	10:57	10:59	00:02	.55	.14	78.40	BIZZ	A G F
SA 28/10	28/10	94696	94697	1.0	11:07	11:11	00:04	1.75	.35	78.40	BIZZ	A G F
SA 28/10	28/10	94697	94728	31.1	15:21	15:57	00:36	2.65	4.87	73.60	BIZZ	A G F
SU 29/10	29/10	94728	94728	.6	08:46	08:50	00:04	1.14	.34	75.20	BIZZ	A G F
SU 29/10	29/10	94728	94732	3.2	10:39	10:44	00:05	.14	.60	72.80	BIZZ	A G F
SU 29/10	29/10	94732	94735	3.1	10:57	11:03	00:06	.85	.85	75.20	BIZZ	A G F
SU 29/10	29/10	94735	94737	2.3	12:16	12:30	00:14	10.23	.96	72.80	BIZZ	A G F
SU 29/10	29/10	94737	94739	2.0	13:14	13:17	00:03	.19	.68	75.20	BIZZ	A G F
SU 29/10	29/10	94739	94741	2.0	15:18	15:24	00:06	2.33	.62	68.00	BIZZ	A G F
SU 29/10	29/10	94741	94742	.3	16:00	16:02	00:02	.56	.45	70.40	PRIV	A G F
SU 29/10	29/10	94742	94742	.3	16:08	16:09	00:01	.12	.07	73.60	PRIV	A G F
MO 30/10	30/10	94742	94774	31.7	08:22	09:09	00:47	9.37	4.83	67.20	BIZZ	A G F
MO 30/10	30/10	94774	94783	9.1	11:16	11:28	00:12	.99	1.35	62.40	BIZZ	A G F
MO 30/10	30/10	94783	94785	2.3	11:36	11:43	00:07	2.09	.63	65.60	BIZZ	A G F
MO 30/10	30/10	94785	94786	.2	11:47	11:49	00:02	.33	.10	64.80	BIZZ	A G F
MO 30/10	30/10	94786	94794	8.7	11:51	12:05	00:14	2.81	1.69	64.80	BIZZ	A G F
MO 30/10	30/10	94794	94804	10.0	12:12	12:25	00:13	1.61	1.55	60.00	BIZZ	A G F
MO 30/10	30/10	94804	94814	9.6	13:00	13:13	00:13	2.76	1.52	60.80	BIZZ	A G F
MO 30/10	30/10	94814	94825	11.1	13:43	14:00	00:17	3.64	1.94	57.60	BIZZ	A G F
MO 30/10	30/10	94825	94827	1.7	14:58	15:04	00:06	3.26	.42	54.40	BIZZ	A G F
MO 30/10	30/10	94827	94827	.4	15:10	15:11	00:01	.10	.12	56.80	BIZZ	A G F
MO 30/10	30/10	94827	94829	1.3	15:12	15:14	00:02	.15	.29	53.60	BIZZ	A G F
MO 30/10	30/10	94829	94830	1.7	15:53	15:59	00:06	2.44	.45	55.20	PRIV	A G F
MO 30/10	30/10	94830	94832	1.7	16:04	16:07	00:03	.15	.38	56.00	PRIV	A G F
MO 30/10	30/10	94832	94834	1.5	16:21	16:26	00:05	1.40	.38	54.40	BIZZ	A G F
TU 31/10	31/10	94834	94835	1.2	11:38	11:41	00:03	.56	.70	53.60	BIZZ	A G F
TU 31/10	31/10	94835	94836	1.0	11:58	12:02	00:04	.97	.29	50.40	BIZZ	A G F
TU 31/10	31/10	94836	94838	1.7	12:15	12:17	00:02	.39	.28	52.80	BIZZ	A G F
TU 31/10	31/10	94838	94840	1.8	15:42	15:45	00:03	.31	.62	49.60	BIZZ	A G F
TU 31/10	31/10	94840	94841	1.5	16:09	16:14	00:05	1.17	.71	51.20	BIZZ	A G F
TU 31/10	31/10	94841	94843	1.5	16:23	16:30	00:07	2.79	.48	50.40	BIZZ	A G F
TU 31/10	31/10	94843	94856	12.9	17:51	18:17	00:26	5.77	2.31	44.00	BIZZ	A G F
TU 31/10	31/10	94856	94868	12.5	23:29	23:44	00:15	1.85	1.83	41.60	BIZZ	A G F
WE 01/11	01/11	94868	94873	4.7	14:07	14:15	00:08	1.25	1.03	41.60	BIZZ	A G F
WE 01/11	01/11	94873	94878	4.6	15:16	15:24	00:08	2.46	.96	40.00	BIZZ	A G F
WE 01/11	01/11	94878	94909	31.1	18:28	19:03	00:35	2.56	4.62	40.00	BIZZ	A G F
TH 02/11	02/11	94909	94941	31.7	08:37	09:16	00:39	5.72	4.75	33.60	BIZZ	A G F
TH 02/11	02/11	94941	94942	1.3	12:14	12:16	00:02	.35	.26	36.00	PRIV	A G F
TH 02/11	02/11	94942	94943	1.3	12:18	12:21	00:03	.13	.26	29.60	PRIV	A G F
TH 02/11	02/11	94943	94945	1.4	13:58	14:02	00:04	1.04	.49	31.20	BIZZ	A G F
TH 02/11	02/11	94945	94946	1.5	14:06	14:10	00:04	.90	.41	30.40	BIZZ	A G F
TH 02/11	02/11	94946	94957	10.7	17:13	17:33	00:20	5.22	1.96	30.40	BIZZ	A G F
TH 02/11	02/11	94957	94967	9.7	17:54	18:09	00:15	3.99	1.60	28.80	BIZZ	A G F
TH 02/11	02/11	94967	94967	.3	19:10	19:11	00:01	.24	.14	28.00	BIZZ	A G F
TH 02/11	02/11	94967	94967	.3	19:12	19:14	00:02	.30	.10	26.40	BIZZ	A G F
FR 03/11	03/11	94967	94969	1.1	18:37	18:42	00:05	2.11	.52	28.80	PRIV	A G F
FR 03/11	03/11	94969	94970	1.1	20:14	20:18	00:04	1.33	.37	28.00	PRIV	A G F
SA 04/11	04/11	94970	94970	.3	08:40	08:43	00:03	1.91	.32	25.60	BIZZ	A G F
SA 04/11	04/11	94970	94970	.3	08:43	08:59	00:16	14.10	.48	77.60	BIZZ	A G F
SA 04/11	04/11	94970	94972	1.2	09:00	09:04	00:04	1.50	.40	79.20	BIZZ	A G F
SA 04/11	04/11	94972	94972	.3	09:08	09:09	00:01	.15	.12	78.40	BIZZ	A G F
SA 04/11	04/11	94972	94974	1.6	09:15	09:20	00:05	1.31	.40	77.60	BIZZ	A G F

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AUTOLOG 1000  SYSTEST LOG REPORT FOR VEHICLE:SMP 893        LOGGER S/N: 16777215 01.00      PRINTED: 24/11/95        PAGE 01
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ST DATE	STRT KM	TRIP KM	ST TIME	EN TIME	TRP TME	WA TIME	FU USED	FU REM	MAX FLO	MAX RPM	MAX KPH	VOLTS
SA 28/10	94694	1.2	10:53	10:56	00:03	.13	.87	78.40	31.45	2670	63	11.76
SA 28/10	94695	.3	10:57	10:59	00:02	.55	.14	78.40	15.26	1801	29	12.17
SA 28/10	94696	1.0	11:07	11:11	00:04	1.75	.35	78.40	23.87	2182	61	11.58
SA 28/10	94697	31.1	15:21	15:57	00:36	2.65	4.87	73.60	61.05	4014	114	11.64
SU 29/10	94728	.6	08:46	08:50	00:04	1.14	.34	75.20	21.88	2064	51	12.11
SU 29/10	94728	3.2	10:39	10:44	00:05	.14	.60	72.80	27.55	2340	71	12.58
SU 29/10	94732	3.1	10:57	11:03	00:06	.85	.85	75.20	34.08	2470	69	11.64
SU 29/10	94735	2.3	12:16	12:30	00:14	10.23	.96	72.80	74.42	4641	82	10.82
SU 29/10	94737	2.0	13:14	13:17	00:03	.19	.68	75.20	57.51	3698	83	12.29
SU 29/10	94739	2.0	15:18	15:24	00:06	2.33	.62	68.00	43.43	2980	68	12.23
SU 29/10	94741	.3	16:00	16:02	00:02	.56	.45	70.40	24.51	2049	50	11.70
SU 29/10	94742	.3	16:08	16:09	00:01	.12	.07	73.60	10.69	1749	51	12.29
MO 30/10	94742	31.7	08:22	09:09	00:47	9.37	4.83	67.20	38.61	2777	97	11.82
MO 30/10	94774	9.1	11:16	11:28	00:12	.99	1.35	62.40	33.13	2845	84	12.00
MO 30/10	94783	2.3	11:36	11:43	00:07	2.09	.63	65.60	27.91	2340	64	11.64
MO 30/10	94785	.2	11:47	11:49	00:02	.33	.10	64.80	24.19	2016	33	12.00
MO 30/10	94786	8.7	11:51	12:05	00:14	2.81	1.69	64.80	42.24	3216	76	11.82
MO 30/10	94794	10.0	12:12	12:25	00:13	1.61	1.55	60.00	39.34	3210	89	11.76
MO 30/10	94804	9.6	13:00	13:13	00:13	2.76	1.52	60.80	45.84	3266	100	11.53
MO 30/10	94814	11.1	13:43	14:00	00:17	3.64	1.94	57.60	50.60	3524	90	11.70
MO 30/10	94825	1.7	14:58	15:04	00:06	3.26	.42	54.40	37.20	3073	73	11.53
MO 30/10	94827	.4	15:10	15:11	00:01	.10	.12	56.80	22.16	2145	65	11.47
MO 30/10	94827	1.3	15:12	15:14	00:02	.15	.29	53.60	28.44	2340	66	12.41
MO 30/10	94829	1.7	15:53	15:59	00:06	2.44	.45	55.20	31.95	2586	67	11.41
MO 30/10	94830	1.7	16:04	16:07	00:03	.15	.38	56.00	23.09	2102	67	11.76
MO 30/10	94832	1.5	16:21	16:26	00:05	1.40	.38	54.40	18.06	2005	53	11.58
TU 31/10	94834	1.2	11:38	11:41	00:03	.56	.70	53.60	32.90	2496	58	12.35
TU 31/10	94835	1.0	11:58	12:02	00:04	.97	.29	50.40	26.02	2352	55	12.17
TU 31/10	94836	1.7	12:15	12:17	00:02	.39	.28	52.80	26.19	2410	71	12.06
TU 31/10	94838	1.8	15:42	15:45	00:03	.31	.62	49.60	29.14	2317	68	12.06
TU 31/10	94840	1.5	16:09	16:14	00:05	1.17	.71	51.20	32.33	2600	60	11.53
TU 31/10	94841	1.5	16:23	16:30	00:07	2.79	.48	50.40	22.74	1996	55	11.41
TU 31/10	94843	12.9	17:51	18:17	00:26	5.77	2.31	44.00	41.14	3360	101	11.17
TU 31/10	94856	12.5	23:29	23:44	00:15	1.85	1.83	41.60	28.23	2435	95	11.23
WE 01/11	94868	4.7	14:07	14:15	00:08	1.25	1.03	41.60	37.52	3053	75	12.41
WE 01/11	94873	4.6	15:16	15:24	00:08	2.46	.96	40.00	34.13	2717	90	11.94
WE 01/11	94878	31.1	18:28	19:03	00:35	2.56	4.62	40.00	68.43	4595	105	11.58
TH 02/11	94909	31.7	08:37	09:16	00:39	5.72	4.75	33.60	55.57	4093	98	11.88
TH 02/11	94941	1.3	12:14	12:16	00:02	.35	.26	36.00	31.76	2640	69	11.76
TH 02/11	94942	1.3	12:18	12:21	00:03	.13	.26	29.60	28.46	2297	62	12.41
TH 02/11	94943	1.4	13:58	14:02	00:04	1.04	.49	31.20	30.94	2686	59	11.70
TH 02/11	94945	1.5	14:06	14:10	00:04	.90	.41	30.40	28.31	2544	65	11.47
TH 02/11	94946	10.7	17:13	17:33	00:20	5.22	1.96	30.40	71.18	4507	92	11.53
TH 02/11	94957	9.7	17:54	18:09	00:15	3.99	1.60	28.80	51.67	3640	95	11.58
TH 02/11	94967	.3	19:10	19:11	00:01	.24	.14	28.00	33.01	2875	58	10.58
TH 02/11	94967	.3	19:12	19:14	00:02	.30	.10	26.40	15.37	1897	51	11.17
FR 03/11	94967	1.1	18:37	18:42	00:05	2.11	.52	28.80	35.44	2686	59	10.70
FR 03/11	94969	1.1	20:14	20:18	00:04	1.33	.37	28.00	30.20	2373	59	10.76
SA 04/11	94970	.3	08:40	08:43	00:03	1.91	.32	25.60	27.41	2175	44	11.88
SA 04/11	94970	.3	08:43	08:59	00:16	14.10	.48	77.60	13.39	2686	44	11.94
SA 04/11	94970	1.2	09:00	09:04	00:04	1.50	.40	79.20	31.34	2615	57	12.00
SA 04/11	94972	.3	09:08	09:09	00:01	.15	.12	78.40	18.50	1884	54	12.17
SA 04/11	94972	1.6	09:15	09:20	00:05	1.31	.40	77.60	19.40	2111	58	12.06

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SH11 AUTOLOG LOGDUMP 5B
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S1230480000000000000000000000000000000000000000000000000000000000000058
S12304A0000000000000000000000000000000000000000000000000000000000000038
S12304C0000000000000000000000000000000000000000000000000000000000000018
S12304E000000000000000000000000000000000000000000000000000000000000F8
S1230500000000000000000000000000000000000000000000000000000000000000D7
S1230520000000000000000000000000000000000000000000000000000000000000B7
                    .
                    .
                    .
                    .
S1230620000000000000000000000000000000000000000000000000000000000000B6
S1230640000000000000000000000000000000000000000000000000000000000000096
S1230660000000000000000000000000000000000000000000000000000000000000076
S1230680000000000000000000000000000000000000000000000000000000000000056
S12306A0000000000000000000000000000000000000000000000000000000000000036
S12376A0036401FE037401FB036001F6035D01F0034701EB034801E5034201E4034601DF88
S12376C0033901D8033001D3032501D3030801CA02F301C802FC01C3030101C202F801BBBB
S12376E002F601BA02DD01B402D701B502E301AE02E701AB02CD01A7000000000000000010
S1237FE00000000000000000000000000000000000000000000000000000000000AAD3
S9030000FC
```

APPENDIX C - ALDL Data Display Option.

App C 1.00 ALDL display menu groups

When The Autolog 1000 is fitted with the Assembly Line Diagnostic Link (ALDL) data option, the following two menu groups allow the user to access the ALDL data items, flag bits and malfunction codes :-

```
[ ALDL DATA   >  Access to the ALDL data items.
[ ALDL FLAGS  >  Access to the ALDL flag, switch and malfunction data items.
```

These menu groups operate in the same manner as normal menu groups and are for the most part 'display only' menu items.

App C 2.00 ALDL Menu Data Items

App C 2.10 ALDL DATA menu group data items.

This menu group displays the ALDL data values, depressing the ITEM button will rotate the display through the following menu items :-

```
ALDL STATUS   ??   ALDL data transmission mode On or Off.
PROM IDENT  XXXX   ECM Memcal ROM identity number.
IAC COUNT    XXX   Idle air control stepper motor count.
CTS TEMP  S XXX   Cooling system water temperature.
VEHICLE KPH  XXX   Vehicle speed.
MAP VOLTS   X.XX   Manifold pressure sensor output voltage.
MAP PRES kPa XXX   Manifold pressure in kilopascals.
ENGINE RPM  XXXX   Engine RPM.
TPS VOLTS   X.XX   Throttle position sensor output voltage.
FUEL FLOW    XXX   Engine fuel flow rate.
MAT TEMP   S XXX   Inlet manifold air temperature.
OXYGEN mV   XXXX   Oxygen sensor output voltage (millivolts).
BATT VOLTS   XXX   Battery voltage x 10
INTEGRATOR   XXX   Fuel injection integrator setting.
BLOCK LEARN  XXX   Fuel injection block learn setting.
[ ALDL DATA    >   The ALDL data menu group heading.

Where  ?? is ON = on, OF = off. This is a user alterable value.
       S is a + or - sign
       X is a decimal digit, usually leading zeros are suppressed.
```

C 2.11 ALDL data menu item descriptions.

ALDL STATUS   ??   : This menu item allows the user to turn the ALDL link ON and OFF. This is done by pressing GROUP and ACK together, this causes a flashing cursor to appear, then either the PLUS or MINUS buttons may be used to select either ON or OF, depressing ACK will initiate the change of status, depressing the ITEM button will abandon the change.

It is important to leave the ALDL link turned OFF when the vehicle is being serviced, otherwise it will interfere with the operation of the service technicians engine scan tool which also uses the ALDL data link.

PROM IDENT XXXX :   This is the identity number of the 'plug in' read only memory in the engine control module (ECM) computer. This number is also referred to as the MEM-CAL ID number. This will be model dependent and may vary during the production life of a particular model.

IAC COUNT   XXX :   This number represents the current number of step pulses applied to the idle air control stepper motor. It can be used as an indicator of incorrect fuel pressure and air leaks. This count varies from vehicle to vehicle and varies according to engine temperature, throttle position, and accessories in use. It also varies when the transmission is moved between drive and neutral. This number should be between 20 and 90 at idle with normal engine temperature, no accessories on, and in park/neutral.

CTS TEMP S XXX :   This indicates the degrees centigrade temperature of the cooling system water. while the engine is running normally, this temperature will be between 60 and 95 degrees. Temperatures of minus 30 degrees or plus 130 degrees may indicate a temperature sensor or wiring failure . Such failures generally generate an ECM malfunction code.

VEHICLE KPH XXX :   This indicates the ECM's version of the vehicle speed and will generally be within two kph of the Speedo reading. If this reading is zero at all times there will also be problems with engine stalling and the auxiliary electric cooling fan not turning off or on at the correct vehicle speed. Failures that cause this reading to be incorrect will generally cause ECM malfunction codes. If this reading consistently differs from the vehicle speedometer by more than 5 kph the vehicle speedometer may be faulty.
.

MAP VOLTS   X.XX :   The manifold pressure signal is used by the ECM to keep the engine air/fuel ratio corrected for atmospheric conditions. This voltage will be close to 5 volts with the ignition on and the engine not running. When the motor is running and when the vehicle is in motion this voltage will vary between 1 and 5 volts depending on vehicle load, throttle position and speed. Failure of this sensor or wiring will generally generate an ECM malfunction code.

MAP PRES kPa XXX :   This is a display of the manifold pressure in kilopascals and allows the MAP sensor to be compared with a barometer reading. A pressure of one atmosphere is around 100 kPa this of course will vary depending on the height above sea level and the prevailing atmospheric conditions. At idle this reading will be between 30 and 50 kPa.

C 2.11 ALDL data menu item descriptions continued

ENGINE RPM XXXX :   This is the engine's version of its own rotational speed. Generally this reading will be in the vicinity of 600 to 700 rpm at idle, the exact speed will change depending on engine temperature, accessories on and if in drive or neutral. It will be nearer 600 rpm in drive with the engine at normal operating temperature.

TPS VOLTS   X.XX :   The throttle position sensor gives the ECM information to allow the correct air/fuel ratio to be computed for acceleration and maximum fuel economy. At idle the TPS voltage will be less that 1 volt, at wide-open throttle it should be greater than 4 volts. This can be checked with the ignition on and engine not running. Failure of the throttle position sensor or wiring will result in poor starting and unstable engine running, generally failure of the throttle position sensor or wiring will result in the generation of ECM malfunction codes.

FUEL FLOW   XXX :   This represents the current fuel flow into the engine in litres per hour. This figure will be normally be in the range of 1.3 to 2.8 and varying. This figure can be used to check that the Autolog Trip Computer is getting correct signals from the vehicle-wiring loom. This is done by comparing this reading against the INST L/HR XX.XX figure in the [VEHICLE DATA > menu.

MAT TEMP   S XXX :   The Inlet manifold air temperature is used by the ECM to compute the correct air/fuel mixture for the engine. This temperature will generally be much hotter than the ambient air temperature and will be around 10 to 30 degrees below the CTS temperature. Failure of the sensor or wiring will result in temperatures of minus 30 degrees or plus 130 degrees. Such failures will normally generate ECM malfunction codes

OXYGEN mV   XXXX :   The oxygen sensor output voltage is used to give the ECM feedback on the current air/fuel ratio in the engine. Once the engine is up to temperature the oxygen sensor monitors the exhaust gasses to make sure that there is enough oxygen still left in the exhaust gasses to enable the pollution control catalytic converter to convert as much exhaust gas as possible to carbon dioxide and water. Once the engine is accelerated above idle the oxygen sensor allows the engine to operate in 'closed loop' mode, continuously optimising the air/fuel ratio, when this is happening the oxygen sensor will fluctuate between 150 millivolts and 900 millivolts as the ECM tries to optimise the reading at around 450 millivolts. If the oxygen sensor fails or is poisoned by use of wrong fuel ECM malfunction codes will normally be generated.

BATT VOLTS   XXX :   The Battery voltage display shows the voltage reaching the ECM, this display is scaled by a multiplier of 10 so that 13.0 volts reads as 130. This reading can be used to get a snapshot of the state of the alternator, voltage regulator and battery. A reading of around 136 (13.6 volts) should occur with the engine at 2000 rpm and the lights on high beam.

C 2.11 ALDL data menu item descriptions continued

INTEGRATOR   XXX :   The fuel injection integrator value shows short-term corrections that are being made to the engine air/fuel ratio in 'closed loop' mode. In 'closed loop' operation the integrator value will vary in the range 118 to 138, its normal value is 128. Bigger numbers indicate the fuel injectors are being held open longer to richen the air/fuel mixture.

BLOCK LEARN XXX :   The fuel injection block learn value is an air/fuel ratio correction that the ECM has learnt to use to give the correct air/fuel ratio under a variety of operating conditions. The block lean programme in the ECM continuously checks the integrator value and adjusts to any long-term trends. A normal value for the block learn is 128 and it should follow the integrator value. Over a long period of time the block learn will try to keep the integrator at 128 by changing its own value to compensate for something causing a permanent change to the air/fuel ratio under normal conditions. Continuous operation outside the normal range may indicate air leaks, blocked injectors, sensor failures or incorrect fuel pressure. Problems causing block learn deviations will often cause ECM malfunction codes to occur.

A Warning on the use of ALDL data. The user is cautioned to get some **experienced help** if they are getting unusual ALDL readings.

 If the readings are out of range but the vehicle seems to be operating normally first check that the ALDL STATUS ?? shows that the ALDL link is running (ON) and getting current information.

 If the vehicle is obviously sick when it is driven and shows out of range readings or malfunction codes get some advise from a qualified person before changing any parts. Sometimes faults are caused by wiring and connector problems and not the part it appears to be from the ALDL data.

If the vehicle is suddenly showing multiple malfunction codes there may be a simple but common cause for all the problems reported by the ALDL scan.

If the first use of the Autolog ALDL scan produces apparent ECM malfunction codes, get some experienced help, the codes may or may not be current and valid

Malfunction Codes remain in the ECM until it is reset by removal of the Engine fuse for 30 seconds, once the ECM is reset the engine must be run at over 2000 rpm for 10 seconds when it is restarted so that the idle air control valve (IAC) stepper motor will re-calibrate to the fully extended off position. It is good practise to note any malfunctions codes prior to resetting the ECM, often intermittent faults can cause a malfunction code to occur, data on intermittent faults may save a lot of fault finding expense at some later time.

App C 2.20 ALDL FLAGS menu group data items.

       This menu group displays the ALDL flag, switch and malfunction code information. Depressions of the ITEM button rotate the display through the following menu items :-

```
ALDL STATUS    ??   ALDL data transmission mode On or Off.
DATA MODE      O/F  ALDL 10K mode data transmission mode flag.
LIMP MODE      O/F  ALDL 3.9K mode or 'Limp Home' mode flag.
REF PULSE      O/F  Engine reference pulse flag.
A/C SWITCH     O/F  Airconditioner switch chain flag.
IGN BYPASS     O/F  Ignition in ECM bypass mode flag.
TRANS O'TEMP O/F    Transmission overtemperature in overdrive flag.
PARK/NEUT      O/F  Transmission Park/Neutral switch flag.
CLOSED LOOP    O/F  Engine running 'Closed Loop' mode flag.
T/C CLUTCH     O/F  Torque converter clutch status flag.
A/C CLUTCH     O/F  Airconditioner clutch status flag.
ELEC FAN       O/F  Electric engine cooling fan status flag.
MALF CODES: MMMM    ECM malfunction code display (first 16 codes).
T DATA: HHHHHHHH    Autolog Service Technician's ALDL verification data.
[ ALDL FLAGS   >    The ALDL flags menu group heading.

Where: ?? is ON = On, OF = Off. This is a user alterable value.
       O/F is ON = On, OFF = Off
       MM is malfunction code number or the words 'NONE' or 'END'.
       : denotes a multi-item data set that can be stepped through
             using the PLUS and MINUS buttons.
       H is a hexadecimal number.
```

C 2.21 ALDL flags menu item descriptions.

   ALDL STATUS   ??   : This menu item allows the user to turn the ALDL link ON and OFF. This is done by pressing GROUP and ACK together, this causes a flashing cursor to appear, then either the PLUS or MINUS buttons may be used to select either ON or OF, depressing ACK will initiate the change of status, depressing the ITEM button will abandon the change.

It is important to leave the ALDL link turned OFF when the vehicle is being serviced, otherwise it will interfere with the operation of the service technicians engine scan tool which also uses the ALDL data link.

   DATA MODE   O/F : This flag is ON when the ECM is in normal ALDL data transmission mode, this mode is often referred to as 10K mode.

   LIMP MODE   O/F :   This flag indicates that the ECM is in either its 'limp home' mode due to an internal problem or is in the factory test mode referred to as 3.9K mode. The limp home mode allows the ECM to run the engine in the most basic way possible after an internal ECM problem is detected. This allows the vehicle to 'limp home' for repairs. This flag should normally be OFF

C 2.21 ALDL flags menu item descriptions continued

REF PULSE   O/F :   The engine reference pulses occur when the engine is running, this flag should toggle ON and OFF whenever ever the engine is running.

A/C SWITCH   O/F :   This flag indicates the state of the chain of switches that enables the Airconditioner to run. The chain starts with the drivers air-conditioning on/off and air blower switches and goes through high and low pressure safety switches and the temperature cycling switch. All the switches must be closed for this flag to be on. During normal operation this flag will go ON and OFF as the Airconditioner temperature cycling switch cuts in and out. When the Airconditioner is initially turned on this flag will immediately go ON if all is well and the blower fan is on.

IGN BYPASS   O/F :   This flag indicates a failure of the ECM to get cylinder-firing pulses to the ignition control module. When this occurs the ignition control module goes into a fallback mode of operation to allow the car to 'limp home' for service. ON indicates that the ECM is being bypassed by the ignition control module. This flag should normally be OFF. Ignition bypass mode will generally cause a malfunction code to be generated.

TRANS O'TEMP O/F :   This flag indicates that the automatic transmission is too hot (>130 degrees C) and it's in overdrive (4th gear). This signal is a request to ECM to use the torque converter clutch to try to get the transmission temperature down. The ECM then applies the torque converter clutch at any time the throttle is more that 4 percent open so that the transmission oil will cool. This flag is normally OFF

PARK/NEUT   O/F :   This flag shows the state of the Park/Neutral safety switch. This switch prevents the engine being started unless the transmission is in either Park or Neutral. This flag is ON in Park/Neutral and OFF in all other transmission selector positions.

CLOSED LOOP O/F :   This flag shows when the engine is running 'Closed Loop' air/fuel ratio control. This switch will normally be OFF at idle and will go ON with slight throttle application. When the vehicle is in stop start traffic it will remain ON for short periods of idling, going OFF during longer periods of idling.

T/C CLUTCH   O/F :   This flag indicates the state of the transmission torque converter clutch . This clutch locks up the torque converter to save fuel once the vehicle is doing more than 70 kph and the transmission is up to normal temperature. If the throttle is closed or opened beyond 63 percent, the torque converter clutch is immediately disengaged. When the clutch is engaged this flag is ON

C 2.21 ALDL flags menu item descriptions continued

A/C CLUTCH   O/F :   This flag indicates the ON or OFF state of the Airconditioner compressor clutch. When the flag is ON the clutch is engaged and the compressor is running.

ELEC FAN   O/F :   This flag indicates the ON or OFF state of the electric auxiliary cooling fan. The electric fan will be ON anytime the Airconditioner is on and the vehicle speed is less than 55 kph. It will also come ON if the engine coolant temperature gets above 107 degrees C. At this high coolant temperature the Airconditioner will be disabled until the engine coolant temperature drops.

MALF CODES: MMMM :   This menu item allows the examination of the first 15 ECM malfunction codes. If no codes are present the words 'NONE' will appear when this item is selected. If there are malfunction codes the first one will display immediately this item is selected, depressing the PLUS or MINUS buttons will step forward (PLUS) and backward (MINUS) through the list of malfunction codes. The last malfunction code is followed by the words 'END'. A list of malfunction codes and their possible meanings appears in section C 2.22.

T DATA: HHHHHHHH :   This is a special hexadecimal data display for the Autolog service technician's use during installation and service of your Autolog computer.

C 2.22 ALDL Malfunction code descriptions.

Malfunction codes are in groups of generally five codes, for historical reasons they were arranged this way to allow easy reading of malfunction codes when they were flashed out to the service technician on the dashboard 'Check Engine Light'. Each code digit is not more than five flashes of the light. The following are the codes:

12-15, 21-25, 31-35, 41-45, 51-55

Each code represents a bit in one of the malfunction code bytes in the ECM. There are three malfunction code bytes this allows for twenty-four codes, each of which can occur simultaneously to preserve multiple fault patterns which sometimes result from a simple and single common cause.

C 2.22 ALDL Malfunction code descriptions continued

Code 12: No spark pulses at CPU or else good system, no codes.

Code 13: Oxygen sensor output remained at .35-.55 volts for more than one minute after warm-up. Possible open circuit.

Code 14: Coolant sensor indicated a temperature above 130C for 3 seconds after engine ran for 20 seconds. Probably a short.

Code 15: Coolant sensor indicated a temperature below -30C for 3 seconds when MAT > - 13 or engine running over 1 minute. Probably open circuit.

Code 21: Throttle pos sensor above 2.5 volts for 2 seconds when engine speed below 1600 rpm

Code 22: Throttle pos sensor below .2 volt for 2 seconds while engine running.

Code 23: MAT sensor shows < -30 degrees C for 3 seconds after engine running 1 minute or coolant > 30C. Probably an open circuit.

Code 24: No speed sensor pulses when engine between 2000-4000 rpm, throttle closed, high vacuum, not in neutral and all for 5 seconds.

Code 25: MAT sensor showed above 145 degrees C for 2 seconds after engine ran for over 1 minute. Possible short circuit.

Code 31: Unknown Error Code.

Code 32: Unknown Error Code.

Code 33: MAP sensor voltage too high (> 4.00 v). Possible vacuum leak to sensor or faulty sensor.

Code 34: MAP sensor voltage too low (< 0.25 v) with ignition on or engine running >1200 rpm and throttle open >20%.

Code 35: Closed throttle idle speed is more than 75 rpm above or below correct value for more than 45 seconds.

Code 41: No Crankshaft reference pulses. Ignition voltage < 11 volts etc.

Code 42: Open or short on EST or BYPASS line to ignition module

Code 43 Engine Knock Sensor open or shorted.

Code 44: O2 sensor showed < 0.250 volt for over 20 seconds while operating closed loop.

Code 45: O2 sensor showed > 0.550 volt for over 50 seconds while in closed loop with engine running over 1 minute and throttle open more than 2%.

Code 51: Check insertion of MEMCAL in socket and bent pins.

Code 52: Check that CALPAK is in place, fully inserted, and no bent pins.

Code 53: Car's alternator has produced >17.1 volts for over 2 seconds. Check charging system.

Code 54: Unknown error code.

Code 55: ECM A to D error. Check ECM grounds, or excessive input voltage.

C 2.23 Connecting the ALDL option to the vehicle.

Connections to pins four and two of the ALDL connector on the vehicle need to be made as follows:-

```
ALDL connector pin no.        Autolog pin no.   Autolog sig converter term no.

    4 (ALDL data)             10 (Dk Blue)                2
    2 (ALDL control)           1 (Silver)                 1
```

The connections should be made using 24/0.2 stranded wire; the wires should be soldered onto the wires at the rear of the vehicle ALDL connector. When soldering the connections make sure the vehicle ignition is off and the soldering iron has no voltage potential relative to the vehicle body shell. After making the connections dress the wires to allow the vehicle ALDL connector to go back where it originally was so that it is still accessible to the vehicle service technicians.

C 2.24 The Vehicle ALDL connector

The ALDL connector is located to the left rear of underneath the glove compartment. It generally is just tucked into the trim so that the service personnel can reach it easily.

The ALDL connector has six pins and is arranged as follows when viewed from the mating connection side with the locking tang at the bottom: -

```
          ----------           Mating connector type XB4 (make unknown)
         | 5 4 3 2 |
         | 6     1 |           GM Tech 1 mating connector TA02329A
         ---/  \---
            ----
    Pin no                  function                          Tech 1

      6          +12 volts                                       H
      5          Fuel pump test                                  G
      4          Check engine light (CEL) and serial data (0 to +12v)  E
      3          Torque converter clutch                         F
      2          Diagnostic test terminal (mode control input)   B
      1          Earth                                           A
```

To place the ECM in ALDL mode a resistor is placed between pins one and two. The serial data comes out on pin four.